

Total Maximum Daily Load for Fecal Coliform for the Lower Salinas River Watershed, Monterey County, California

Phase-4: Project Analysis: Final Preliminary Project Report



August 6, 2007

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<http://www.swrcb.ca.gov/rwqcb3/TMDL/index.htm>

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Adopted by the
California Regional Water Quality Control Board
Central Coast Region
on _____, 200x

Approved by the
State Water Resources Control Board
on _____, 200 x
and the
Office of Administrative Law
on _____, 200 x
and the
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on _____. 200 x

Cover Photograph: Old Salinas River Estuary, Monterey County (2005), by Carol Myers

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1. PROJECT DEFINITION

1.1. Project Status

The State of California's guidance for addressing impaired waters (Process for Addressing Impaired Waters in California, June 2005) describes eight phases for addressing impaired waters. These eight phases are referred to as:

1. Phase-1; Project Definition
2. Phase-2; Project Planning
3. Phase-3; Data Collection
4. Phase-4; Project Analyses
5. Phase-5; Regulatory Action Selection
6. Phase-6; Regulatory Process
7. Phase-7; Approval
8. Phase-8; Implementation.

The TMDL for Fecal Coliform in the Lower Salinas River Watershed (herein referred to as the Project) is currently in Phase Four, Project Analyses, which ends with the completion of this document, the Final Preliminary Project Report.

Staff prepared A Final Preliminary Project Report and posted it on the Central Coast Water Board's website in June 2006. The 2006 report contained analysis of data and preliminary conclusions based on data and information obtained up to April 2006. Since April 2006, staff has collected more data and information. In addition, an outbreak of *E. coli* O157:H7 occurred in September 2006 as a result of contaminated spinach; many people became ill as a result of the outbreak, some lost their lives. Experts initially believed that the contaminated spinach could have originated from the Project watershed. Attention on the watershed, food safety issues, and an overall analysis of what is known about water quality and its relationship with food safety issues resulted in an intense focus on the Project area as well as surrounding watersheds. Consequently, Water Board staff (staff) decided to collect data and information as it became available during this critical time, rather than moving forward to the next phase of the Project. Therefore, this Final Preliminary Project Report document, dated June 2007, is actually the second version of the Final Preliminary Project Report.

Staff will develop a Draft Project Report, which will be the first report associated with Phase 5-Regulatory Action Selection. The Draft Project Report will contain draft technical analysis and recommendations for implementing the TMDL. Staff anticipates the Draft Project Report will be completed in September 2007.

The Final Project Report, the last report of Phase-5, contains the elements that will be presented to the Central Coast Water Board for TMDL approval. Staff

anticipates that the Final Project Report will be completed in early 2008. Finally, staff anticipates that the Central Coast Water Board hearing (to consider approval of the TMDL) will be in July 2008.

Staff held a California Environmental Quality Act (CEQA) scoping and public participation meeting in June 2007. Stakeholders presented comments to staff at the meeting regarding the Project in general, as well potential environmental impacts of the Project. Staff plans to hold another public outreach meeting upon the completion of the Draft Project Report (anticipated in Fall 2007). In addition, the public will have an opportunity to formally comment on the Project before the Water Board Hearing (anticipated in July 2008).

Readers of this document should be aware that uncertainties regarding the Project still exist. Staff has attempted to alert the reader in the following sections where these uncertainties lie.

As always, we invite the public to share information with staff regarding the project. Your concerns and ideas for and about improving water quality in our waters are invited, and are not limited to public outreach meetings or formal comment periods. Please see the staff contact person information on the cover page of this report if you believe you have information that would be valuable to this Project.

1.2. Introduction

This Project addresses impairment of the Salinas River (River) and several of its tributaries due to elevated density of fecal coliform. The following bodies of water were listed as impaired on Section 303(d) of the Clean Water Act due to elevated levels of fecal coliform:

1. Salinas River (Lower) (from Gonzales downstream to the Salinas River Lagoon)
2. Old Salinas River Estuary
3. Tembladero Slough
4. Salinas Reclamation Canal
5. Gabilan Creek
6. Alisal Creek

Fecal coliform and a subset of fecal coliform, *Escherichia coli* (*E. coli*), are used as indicators for the presence of other pathogenic organisms. Fecal coliform and *E. coli* are referred to as indicator bacteria for the purposes of this report. Some fecal coliform and *E. coli* genera are pathogenic to humans, some are not pathogenic.

Note that the units of *density* and *concentration* are used synonymously in this report when referring to numbers of indicator bacteria in a stated volume of water.

1.3. Project Area

The Project area for this TMDL includes the watershed area contributing flow to the Old Salinas River Estuary, upstream to the Salinas River crossing at Gonzales Road near the city of Gonzales. Figure 1-1 illustrates the water bodies in the Project area and the watershed area contributing to these water bodies.

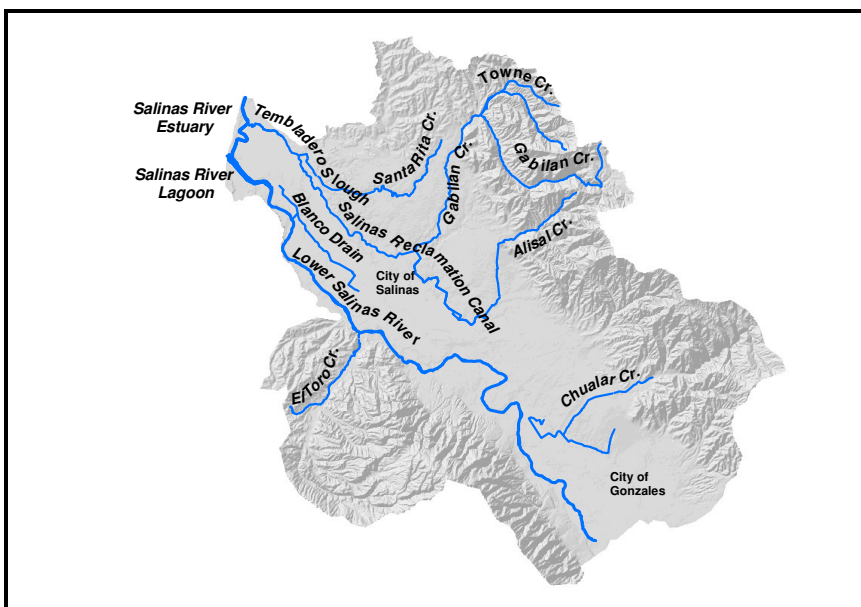


Figure 1-1 Project area water bodies and contributing watershed.

1.4. Beneficial Uses

Water quality objectives are in place to protect beneficial uses of the surface waters. Stated another way, in some cases numeric water quality objectives are in place to protect particular designated uses of water. In the case of this project, water contact recreation is the most sensitive water recreation use, i.e. it carries the strictest numeric objectives for indicator bacteria.

Shellfish harvesting has a stricter water quality standard than water recreation. Shellfish harvesting is a designated beneficial use of the Salinas River Lagoon, the Salinas River Estuary, and Tembladero Slough. During early investigations of impairment in these waterbodies, staff determined that the shellfish harvesting beneficial use was not and could not likely be achieved. Therefore, staff

proposes to remove the shellfish harvesting beneficial use from these bodies of water. Justification for removal of the shellfish harvesting beneficial use is provided in Appendix-A (Summary of Use Attainability Analysis) of this document. Since staff is proposing the removal of the shellfish harvesting beneficial use, the stricter standard will not apply if the beneficial use is removed.

During the environmental scoping and public participation meeting in June 2007, stakeholders expressed concern that some of the water bodies in the project area are designated to support the water contact recreation beneficial use. Stakeholders expressed concern that some of these water bodies can not support water contact recreation because:

- They occur on private lands used for purposes other than water contact recreation.
- Waters present during dry months of the year in some water bodies may not be natural flow, but rather ponded water resulting from irrigation on adjacent lands, or intermittent flow resulting from pumping ground water. Furthermore, these ponded areas might have high indicator bacteria concentration not resulting from loading, but from bacteria growth in sediment and/or increasing concentration due to evaporation.
- Some water bodies designated to support water contact recreation could not be used for this purpose due to steep embankments, or mud substrate not suitable for wading.
- Natural sources of indicator bacteria may exceed the numeric water quality objectives.

The basis of concern in these comments lies in the fact that water contact recreation is protected by a water quality objective for fecal coliform that is stricter than water contact recreation that does not involve water contact, or even a use designation of no water recreation of any type.

The answers to the questions inherent in these comments were unclear at the time that this report was written. Staff will continue dialogue with stakeholders on these and other issues as the Project proceeds. Staff will also investigate the beneficial use designations in the Project water bodies.

Table 1-1 shows the current beneficial use designations for each water body in the Project area.

Table 1-1 Beneficial uses in the Project area

	SALINAS RIVER From Chualar to Spreckles	SALINAS RIVER downstream of Spreckles	SALINAS RIVER LAGOON (NORTH)	OLD SALINAS RIVER ESTUARY	TEMBLADERO SLOUGH	SALINAS RECLAMATION CANAL	GABILAN CR.	ALISAL CR
MUN	X	X					X	X
AGR	X	X					X	X
GWR	X						X	X
REC1	X		X	X	X	X	X	X
REC2	X	X	X	X	X	X	X	X
WILD	X	X	X	X	X	X	X	X
COLD	X	X	X	X				X
WARM	X	X	X	X	X	X	X	X
MIGR	X	X	X	X				
SPWN			X	X	X		X	X
BIOL			X	X				
RARE			X	X	X			
EST			X	X	X			
FRESH		X						
COMM	X	X	X	X	X	X	X	X
SHELL			X	X	X			
AQUATIC LIFE								

MUN: Municipal and domestic water supply.

AGR: Agricultural supply.

GWR: Ground water recharge.

REC1: Water contact recreation.

REC2: Non-Contact water recreation.

WILD: Wildlife habitat.

COLD: Cold fresh water habitat.

WARM: Warm fresh water habitat

MIGR: Migration of aquatic organisms.

SPWN: Spawning, reproduction, and/or early development.

BIOL: Preservation of biological habitats of special significance.

RARE: Rare, threatened, or endangered species

EST: Estuarine habitat

FRESH: Freshwater replenishment.

COMM: Commercial and sport fishing.

SHELL: Shellfish harvesting.

1.5. Water Quality Objectives

The Central Coast Region's Water Quality Control Plan (Basin Plan) contains specific water quality objectives that apply to indicator bacteria (CCRWQCB,

1994, pg. III-3). These objectives are linked to specific beneficial uses and include:

Shellfish Harvesting (SHELL):

At all areas where shellfish may be harvested for human consumption, the median **total coliform** concentration throughout the water column for any 30-day period shall not exceed 70/100 ml, nor shall more than 10% of the samples collected during any 30-day period exceed 230/100 ml for a five-tube decimal dilution test or 330/100 ml when a three-tube decimal dilution test is used.

The Department of Health Services standards for the protection of the shell fishing beneficial use are:

i. The total coliform median or geometric mean MPN of the water does not exceed 70 per 100 mL and not more than 10 percent of the samples exceed a MPN of 230 per 100 mL for a five-tube decimal dilution test.

ii. The fecal coliform median or geometric mean MPN of the water does not exceed 14 per 100 mL and not more than 10 percent of the samples exceed a MPN of 43 for a five-tube decimal dilution test.

In California, Department of Health Services (DHS) uses the fecal coliform standard most often to classify growing areas (as opposed to total coliform).

Please note: Staff is recommending that the shellfish harvesting beneficial use be removed from the Project water bodies. Therefore, this water quality objective will not apply if the beneficial use is removed.

Water Contact Recreation (REC-1):

Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 per 100ml, nor shall more than 10% of total samples during any 30-day period exceed 400 per 100ml.

Non-Contact Water Recreation (REC-2):

Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 2000 per 100ml, nor shall more than 10% of samples collected during any 30-day period exceed 4000 per 100ml.

Controllable Water Quality conditions.

Controllable water quality must conform to the water quality objectives stated in the Basin Plan. The Basin Plan defines controllable water quality conditions as:

“Controllable water quality conditions are those actions or circumstances resulting from man’s activities that may influence the quality of the waters of the State and that may be reasonably controlled.”

At the time of this report preparation, the State Water Resources Control Board (State Board) was considering revision of State recommended water quality objectives for indicator bacteria. Fecal coliform were used as indicators at levels discussed above, but the State Board was considering a revision to incorporate the use of *E. coli* as indicator bacteria at levels recommended by United States Environmental Protection Agency (USEPA). Staff will monitor the progress of the State Board effort and make necessary changes to this Project during its development.

USEPA recommended levels for *E. coli* are discussed in the following section.

1.6. USEPA Recommended Water Quality Criteria

USEPA periodically updates and publishes water quality criteria recommendations. Table 1-2 summarizes USEPA recommended bacterial water quality criteria for the protection of human health in recreational waters.

Table 1-2 USEPA recommended criteria for *E. coli*.

Indicator	Risk Level	Geometric Mean Density (per 100 mL)	Single Sample Maximum Allowable Density (per 100 mL) ^a			
			Designated Beach Area (75 th percentile)	Moderate Full Body Contact Recreation (82 nd percentile)	Lightly Used Full Body Contact Recreation (90 th percentile)	Infrequently Used Full Body Contact Recreation (95 th percentile)
<i>E. coli</i>	8	126 ^b	235	298	409	575

Source: U.S. EPA (1986).
a. Calculated using the following: single sample maximum = geometric mean * 10^{^(confidence level factor * log standard deviation)}, where the confidence level factor is: 75%: 0.675; 82%: 0.935; 90%: 1.28; 95%: 1.65. The log standard deviation from EPA's epidemiological studies is 0.4 for fresh waters.
b. Calculated to nearest whole number using equation: geometric mean = antilog₁₀ [(risk level + 11.74) / 9.40].

Note that the USEPA water quality criteria are in terms of *E. coli*, whereas the Central Coast Water Board water quality objectives for bacteria are in terms of fecal coliform.

According to USEPA guidance, the preferred criteria level is the geometric mean of 126 MPN/100mL; the single sample maximums are simply statistical extensions of the analysis used to determine the recommended geometric mean density (126 MPN/100mL).

2. WATERSHED DESCRIPTION

The Lower Salinas River and its tributaries can be subdivided into two subwatersheds that in turn are divided into several subwatersheds. The Salinas River Lagoon and the Salinas River Estuary are the two receiving water bodies for tributary subwatersheds. Table 2-1 shows the subdivision into two main receiving water bodies and the tributaries to these receiving water bodies. Figure 2-1 illustrates the waterbodies and their connectivity.

Table 2-1 Receiving waterbodies and tributaries of Project area.

Receiving Water Body	
Salinas River Lagoon	Old Salinas River Estuary
<i>Subwatersheds to the receiving water bodies</i>	
Lower Salinas River	Tembladero Slough
El Toro Creek	Salinas Reclamation Canal
Blanco Drain	Santa Rita Creek
	Gabilan Creek
	Alisal Creek
	Quail Creek
	Chualar Creek

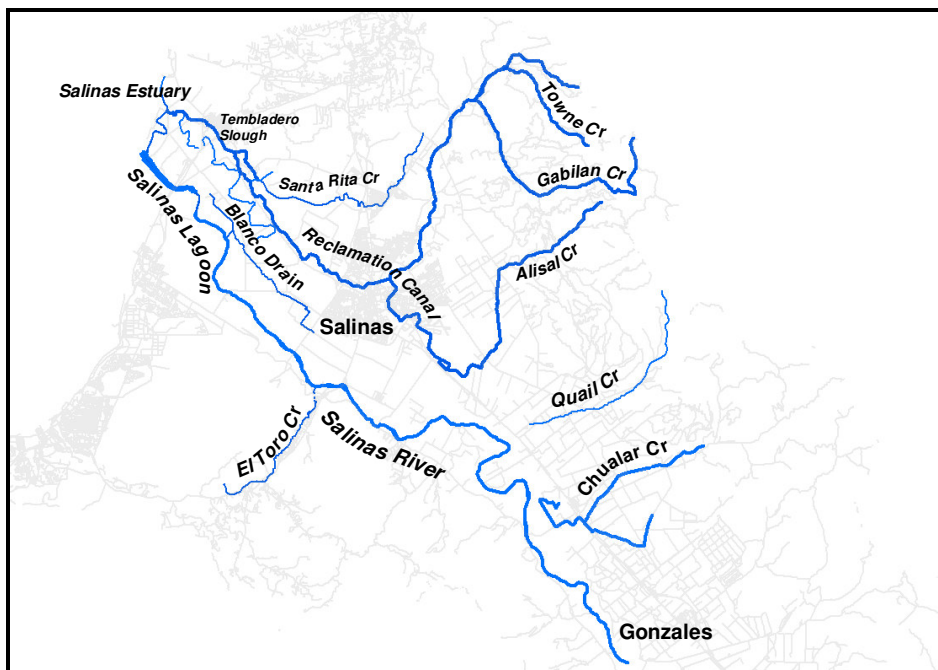


Figure 2-1 Waterbodies in the Lower Salinas River Watershed

2.1. Land Use

Land uses within the subwatersheds were estimated using National Land Cover Data (NLCD). The NLCD was provided by the Multi-Resolution Land Characteristics Consortium, that included the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Forest Service (USFS), the National Atmospheric and Space Administration (NASA), and the Bureau of Land Management (BLM). The NLCD was derived from images taken by Landsat's Thematic Mapper sensor. Staff aggregated the land use categories based on a level II classification scheme of the NLCD. Relative land use contribution is shown in Table 2-2.

Table 2-2 Land uses of project area.

Land Use Type	Acres	Frequency (%)
Row Crops	77,875	29.7
Grassland/Herbaceous	62,514	23.8
Deciduous Shrubland	42,622	16.3
Evergreen Forest	25,327	9.7
Pasture/Hay	20,574	7.8
Mixed Forest	9,052	3.5
Low Intensity Residential	6,771	2.6
Bare Rock/Sand/Clay	4,512	1.7
Other Grasses (Urban/Rec; e.g. parks, lawns)	3,725	1.4
High Intensity Comm/Ind/Trans	3,270	1.2
High Intensity Residential	2,620	1
Deciduous Forest	1,971	0.8
Quarries/Strip Mines/Gravel Pits	444	0.2
Open Water	318	0.1
Emergent Herbaceous Wetlands	290	0.1
Other	101	0.1
Total	261,986	100

ESRI ArcMap was used to create a land use layer for the Project area. The land use cover was used in conjunction with other information and data in the data analysis; land use maps are provided in subsequent sections.

2.2. Hydrology

The watershed area contributing to flow in the main stem of the Salinas River encompasses hundreds of square miles. Although much of the precipitation in the Salinas River Watershed was retained in reservoirs, flow reached over 1000 cubic feet per second during the rain season in the lower portions of the watershed.

Sources of water in the surface waters included precipitation, releases from reservoirs, groundwater, and return flows from agricultural irrigation. Figure 2-2 illustrates mean flow in the Salinas River near Spreckles from 1990 to 2003.

Note that the highest flows occurred from January to March, indicating the influence of precipitation on mean flow.

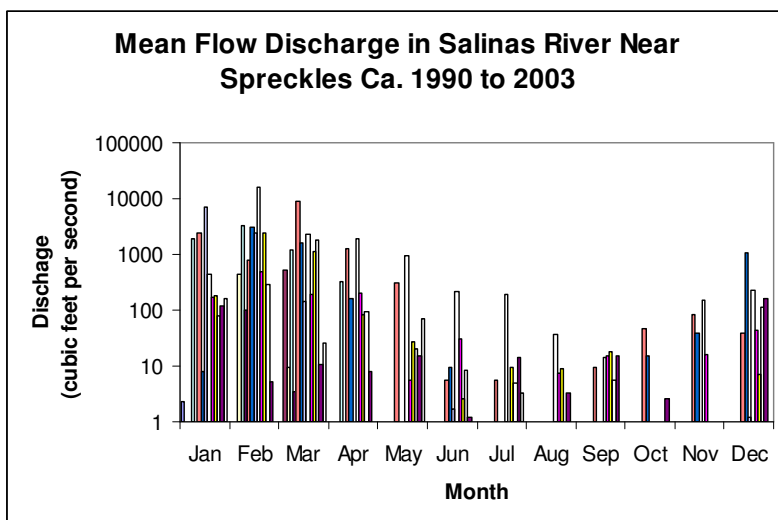


Figure 2-2 Discharge in Salinas River at Spreckles.

Source: USGS gage station at Spreckles, CA.

Some of the surface waters in the watershed were perennial while some were ephemeral. The Lower Salinas River was dry during the late summer months upstream of Davis Road (near the City of Salinas). Alisal Creek was also dry during summer months. In contrast, the Salinas Reclamation Canal, Tembladero Slough, the Salinas River Lagoon, and the Old Salinas River Estuary were perennial; summer flows in these bodies of water were attributed to groundwater and irrigation sources.

Two impervious layers separate groundwater aquifers in the valley of the Watershed. The upper clay layer lies from ten to twenty feet below the surface. The upper clay layer restricts percolating water from entering the deeper aquifer, thereby causing movement of water between the upper groundwater and surface waters, e.g. the Salinas River and its tributaries. As such, groundwater sources to area water bodies were probable. However, it was probable that much of the water percolating downward through the soil profile during summer months originated from agricultural irrigation.

3. DATA ANALYSIS

Staff's assessment of ambient water quality for indicator bacteria for this Project relied principally on analysis for the presence of pathogens using fecal coliform and *E. coli* as indicators. The total coliform group of bacteria is from the family *Enterobacteriaceae*, which includes over 40 genera of bacteria. The total coliform group includes bacteria of both fecal and non-fecal origin. Common habitats for the group include soil, groundwater, surface water, the intestinal tract of animals and humans, the surface of plants, algal-mats in pristine streams, wastes from the wood industry, and biofilms within drinking water distribution systems (Hurst, et al., 2002). Total coliforms can be divided into various groups based on common characteristics. Among these, the fecal coliforms are generally indicative of fecal sources, though not all members of the group are of fecal origin (Hager, et al, 2004, p. 6). The bacteria species, *Escherichia coli*, comprises a large percentage of coliform detected in human and animal feces. Since sewage contains many types of disease-causing organisms, fecal coliform, including *Escherichia coli*, are often used as an indicators of pathogens.

Some strains of *Escherichia coli* (*E. coli*) are pathogenic and some are not. *E. coli* O157:H7 is one of the hundreds of strains of the bacterium *E. coli*. Animal sources of *E. coli* O157:H7 include both domestic and wild animals. Known sources include cattle (beef and dairy), horses, pigs, birds, including waterfowl, flies, dogs, and more. Although most *E. coli* strains are harmless and reside naturally in the intestines of humans and animals, the *E. coli* O157:H7 strain produces a powerful toxin that can cause severe illness, even death. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. Sewage may contain many types of disease-causing organisms; therefore, the presence of *E. coli* O157:H7 indicates not only that a pathogenic *E. coli* is present, but also indicates the potential presence of other pathogenic organisms.

Analysis of water samples to detect the *presence* of fecal coliform and *E. coli* (including O157:H7) is one way to determine the potential presence of pathogens. However, analytical methods for *quantifying* bacteria lack the precision common to many other laboratory methods for water quality analysis. For example, the Multiple Tube Fermentation (MTF) method results in an estimate of the most probable number (MPN) of bacteria. This number can vary considerably for a given result. For example, an MTF result of 1,600 MPN/100ml has a 95% confidence interval ranging from 600 to 5,300 MPN/100ml. The other common method, Membrane Filtration, also has limitations, particularly with highly turbid samples. The Colilert method also results in an MPN of total coliform as well as *E. coli*. The confidence interval is similar, and in some cases better, than the MTF method. Colilert has the advantage of being able to test for the presence of total coliform and *E. coli* in the same procedure and requires less time, relative to the MTF method.

E. coli O157:H7 can be identified using immunochemical and genetic methods. The methods used for isolating and identifying *E. coli* O157:H7 are more time-consuming and costly than the MTF and Colilert methods, but result in a positive identification of the bacterium. Polymerase chain reaction (PCR), culture, and Pathatrix methods for identifying *E. coli* O157:H7 were used for samples collected for this Project.

In spite of the limitations, testing for the presence fecal coliform, including *E. coli*, remains one of the best available methods for indication of potential fecal contamination (Ibid., p. 7), and therefore other pathogens. The MTF and Colilert methods, combined with methods of identifying the presence *E. coli* O157:H7, together provide strong indications of the presence and magnitude of pathogens, and therefore impairment of water quality.

Indicator Bacteria Data

The data used for this Project included four major groups including:

- TMDL Project dataset, including:
 - TMDL Program monitoring activities
 - United States Department of Agriculture (USDA)
- Central Coast Ambient Monitoring Program (CCAMP)
- Facilities regulated by the Central Coast Water Board

The TMDL Project dataset ranged in time from November 2004 to October 2006. Staff and USDA technicians analyzed grab samples for *E. coli* using the Colilert-18 or Colilert-24 method. Over 400 data were analyzed from 27 monitoring sites in the Project area. Staff batched data according to season. All samples taken between 1-November through 30-April represented the wet season batch, and all samples taken between 1-May and 30-October represented the dry season batch. For the analysis of impairment, the geometric mean density was calculated for each batch and compared to the EPA recommended criteria of 126MPN/100mL. Seasonal data batching is an acceptable method for analysis of exceedance (L. Wilcut, USEPA, 2007, personal communication).

The CCAMP dataset used for this project ranged in time from February 1999 to October 2006. These samples were in terms of fecal coliform density that were analyzed by a contracted lab using the Multiple Tube Fermentation Method. A total of 317 data were used from 11 monitoring sites in the Project Area. Staff batched this data seasonally as well, and then determined the percent of data exceeding the 400 MPN/100mL water quality objective. Recall that not more than 10% of data should exceed 400 MPN/100mL to protect the REC-1 beneficial use.

Of the TMDL Project dataset, samples beginning in February 2005 were also analyzed by USDA for the presence of *E. coli* O157:H7 using two separate methods. USDA analyzed samples for the presence of O157:H7 from 31

monitoring sites in the Project area using Pathatrix recovery as well as an immunomagnetic separation method (IMS). In addition, staff placed Moore swabs in flowing waters for five days prior to collection and analysis at some monitoring sites. These samples were subsequently analyzed (by USDA) for the presence of *E. coli* O157:H7. There was a higher probability of detecting *E. coli* O157:H7 using Moore swabs, relative to grab samples, due to the extended length of time the swab was in the creek. Data were expressed in terms of presence or absence of *E. coli* O157:H7.

Spatial Data

Spatial data was prepared by staff using Geographic Information Systems (GIS) software. GIS layers used include the National Hydrologic Data (NHD) for streams, California Watershed Map (CALWATER version 2.2) for watershed boundaries, Geographic Data Technology for roads (DGT roads), and National Land Cover Data (NLCD) for land use. Staff also developed hillshade layers from digital elevation models (DEM) in the Project area.

3.1. Water Quality Data

Indicator Bacteria Concentration and Presence

Samples were collected from the monitoring sites listed in Table 3-1. The table provides locations of monitoring sites as well as summary data for the CCAMP and TMDL Project datasets. The data summary in Table 3-1 represents all the data collected up to the date of this report preparation; this represents an update to the summary provided in the June 2006 Final Preliminary Project Report. Dry season data refers to data gathered from May through October. Wet season data refers to data gathered from November through April.

A map of the monitoring sites is provided in Figure 3-1.

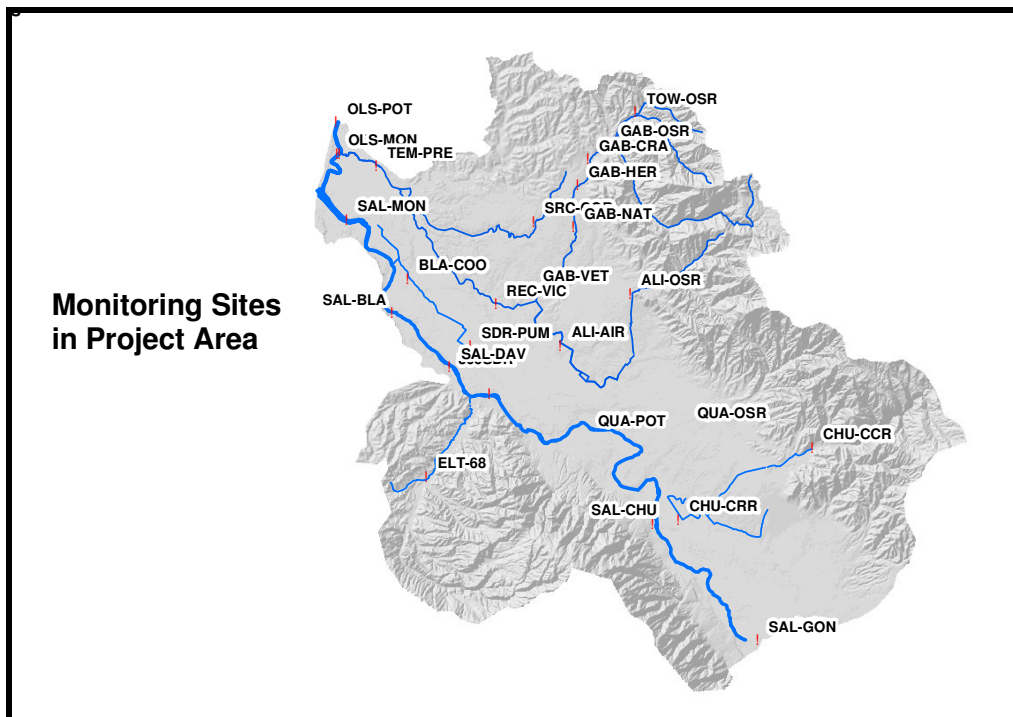


Figure 3-1 Map of monitoring site locations

Table 3-1 Monitoring sites, locations, and summary data.

Site		Fecal Coliform				Generic E. coli				E. coli O157:H7			
				Percent of data exceeding 400 MPN/100mL	Percent of data exceeding 400 MPN/100 mL								
	Monitoring			n ¹	wet season	% >400							
						% >400							
Waterbody	Site	Description	n ¹	wet season	% >400	dry season	n	wet season	n	dry season	no. of +s	n	% +s
Salinas River	Gonzales to Spreckles												
	SAL-GON	Salinas River at Gonzales Road					8	57	7	84	1	16	6
Salinas River	SAL-CHU	Salinas River at Chualar River Road	12	25	8	0	13	95	11	50	0	17	0
	Spreckles to Lagoon												
Salinas River	SAL-DAV	Salinas River at Davis Road	34	35	33	12	22	186	22	32	2	20	10
	SAL-BLA	Salinas River at Blanco Road					12	112	9	80	0	17	0

Salinas River Lagoon (north)													
	SAL-MON	Salinas River at Monte Road	12	17	9	0	10	146	9	37	0	9	0
Old Salinas River Estuary													
	OLS-MON	Old Salinas River at Monterey Dunes Colony	29	52	32	66	23	585	22	224	2	19	11
	OLS-POT	Old Salinas River at Potrero Road	5	60	4	0	5	1351	3	347	2	6	33
Tembladero Slough													
	TEM-PRE	Tembladero Slough at Preston Road in Castroville	9	67	9	78	18	841	15	223	5	21	24

	TEM-MOL	Tembladero Slough at Molera Road	24	58	28	50	23	820	22	106	3	21	14
Salinas Reclamation Canal													
	REC-VIC	Salinas Reclamation Canal at Victor Way					6	476	6	484	2	12	17
Alisal Creek													
	ALI-OSR	Alisal Creek at Old Stage Road	3	100	3	67	1	980					
	ALI-AIR	Alisal Slough at Airport Road	13	77	12	100	16	406	15	538	1	19	5
Gabilan Creek													
	GAB-OSR	Gabilan Creek at Old Stage Road					14	270	9	297	4	22	18

	GAB-CRA	Gabilan Creek at Crazy Horse road					14	786	9	779	8	21	38
	GAB-HER	Gabilan Creek at Herbert Road					14	708	9	600	6	23	26
	GAB-NAT	Gabilan Creek at Natividad Road					9	1852			4	11	36
	GAB-VET	Gabilan Creek at Veterans Park					13	284	9	71	2	21	10
Blanco Drain													
	BLA-COO	Blanco Drain at Cooper Road					10	80	9	87	0	17	0
Stormwater Drain													
	SDR-PUM	Storm Drain Pump off Hitchcock Road					11	1005	8	661	0	15	0

	309SDR	Storm Drain outlet near Davis Road					2	6797	6	195			
Santa Rita Creek													
	SRC-COR	Santa Rita Creek at Cornwall Street					8	545	8	323	0	19	0
Towne Creek													
	TOW-OSR	Towne Creek at Old Stage Road					14	1073	9	921	7	22	32
Arroyo Seco River													
	ARR-GOR	Arroyo Seco River at Gorge upstream of camp area					1	10	3	7	0	4	0
Quail Creek													

		Quail Creek at Old Stage Road	2	50									
	QUA-OSR												
		Quail Creek at Potter Road	7	71	9	89	4	438	6	582			
	QUA-POT												
Chualar Creek													
		Chualar Creek at Chualar Creek Road					1	30440			1	5	20
	CHU-CCR												
		Chualar Creek at Chualar River Road					6	623	1	154	0	10	0
	CHU-CRR												
El Toro Creek													
		El Toro Creek at Hyw-68					2	2849	1	860	0	3	0
	ELT-68												

n¹ Number of data available for analysis.

Note from Table 3-1 that most of the waterbodies had either 10% or more of fecal coliform data exceeding 400 MPN/100mL, or the *E. coli* geometric mean exceeded 126 MPN/100mL. Discussion of impairment is presented in subsequent sections of this report.

3.2. Flow Data

Flow data was not collected as part of this Project. Flow in the Salinas River can reach thousands of cubic feet per second (see Figure 2-2), rendering flow data collection for each sampling event beyond the resources of the Project. In addition, the TMDL and allocations in this report are described in terms of indicator bacteria density, and not load. Flow data is, therefore, not necessary for TMDL and allocation calculations.

3.3. Rain Events

Staff collected samples from thirteen sites during and after two separate rain events. Neither of the rain events were “first flush” events, but rather occurred latter in the rain season. Figure 3-2 illustrates *E. coli* density during rain and non-rain sampling. The darker bars denote rain event sampling densities and hollow bars denote non-rain sampling. Note that the y-axis is log-scale, with non-rain event sampling often being an order of magnitude lower than rain event sampling.

The median *E. coli* density during rain events was 2,685 MPN/100mL, whereas the median density during non-rain sampling was 224 MPN/100mL. Staff conducted statistical analysis of median densities using paired samples. Using the Mann-Whitney analysis, staff found that median density during rain events was statistically greater, compared to non-rain medians occurring shortly after rain events ($p = 0.000$).

Monitoring sites drain a variety of land uses, and all sites, excepting one, had greater *E. coli* density during rain event sampling. There may be several factors driving *E. coli* density higher during rain events. Potential factors included:

- Indicator bacteria loading from surface runoff throughout the watershed.
- Entrainment of indicator bacteria on soil particles and alluvium.

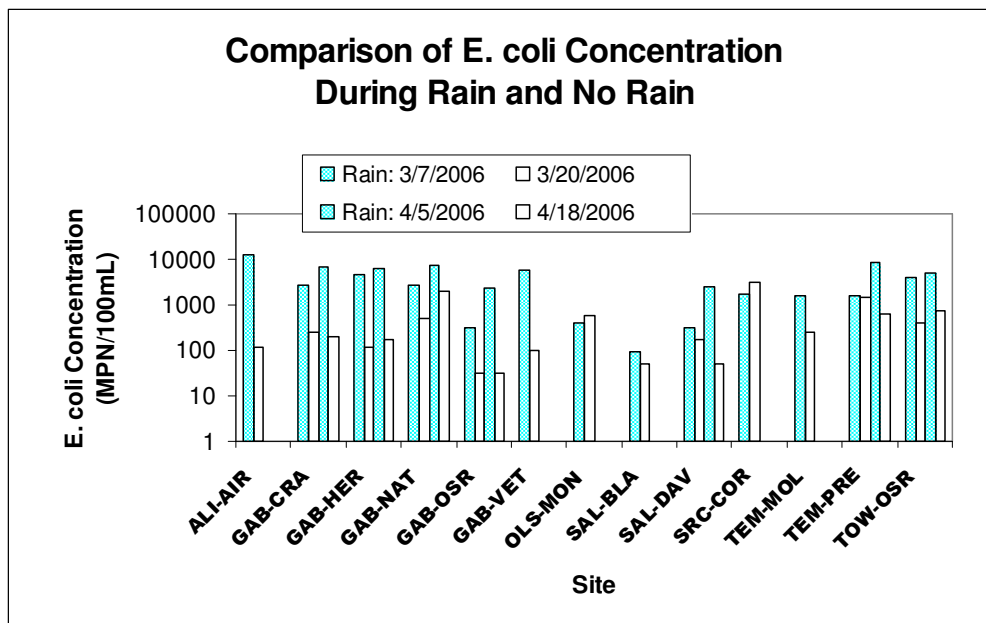


Figure 3-2 Comparing *E. coli* density during rain and non-rain event sampling.

3.4. Seasonal Indicator Bacteria Fluctuation

Section 3.3 discusses *E. coli* density differences during rain and non-rain event sampling. Another trend, perhaps in part related to rain event bacterial density, was seasonal fluctuation. There was a general trend of higher indicator bacteria (fecal coliform and *E. coli*) density during the rain season, relative to the drier summer months. In addition, there was a trend of increasing density during the summer, after a significant reduction in April and May after the rain season.

Figure 3-3 illustrates the monthly medians of the combined fecal coliform (CCAMP) dataset and *E. coli* (TMDL Project) dataset. Note the general trends of higher density in winter, as well as increasing density further into summer. Both of these trends were apparent in the fecal coliform and *E. coli* datasets.

The trend of higher density during the winter months could be explained by:

- Larger watershed area contributing to surface waters in wet weather, therefore increasing the potential for more source contributions.
- Higher indicator bacteria density during rain events resulting in surface runoff and entrainment of indicator bacteria.
- Differing land use practices between wet and dry weather.

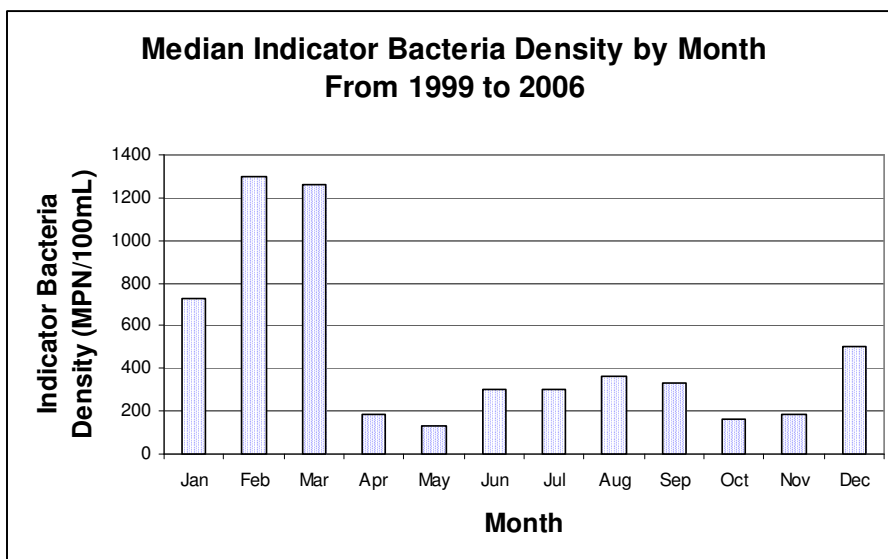


Figure 3-3 Project area combined *E. coli* and fecal coliform medians by month, from February 1999 to April 2006.

Figure 3-4 illustrates the geometric means of *E. coli* during the dry and wet seasons. Recall that dry season data refers to data gathered from May through October, and wet season data refers to data gathered from November through April. The illustration represents all the data collected up to the date of this document preparation; this represents an update to the summary provided in the June 2006 Final Preliminary Project Report.

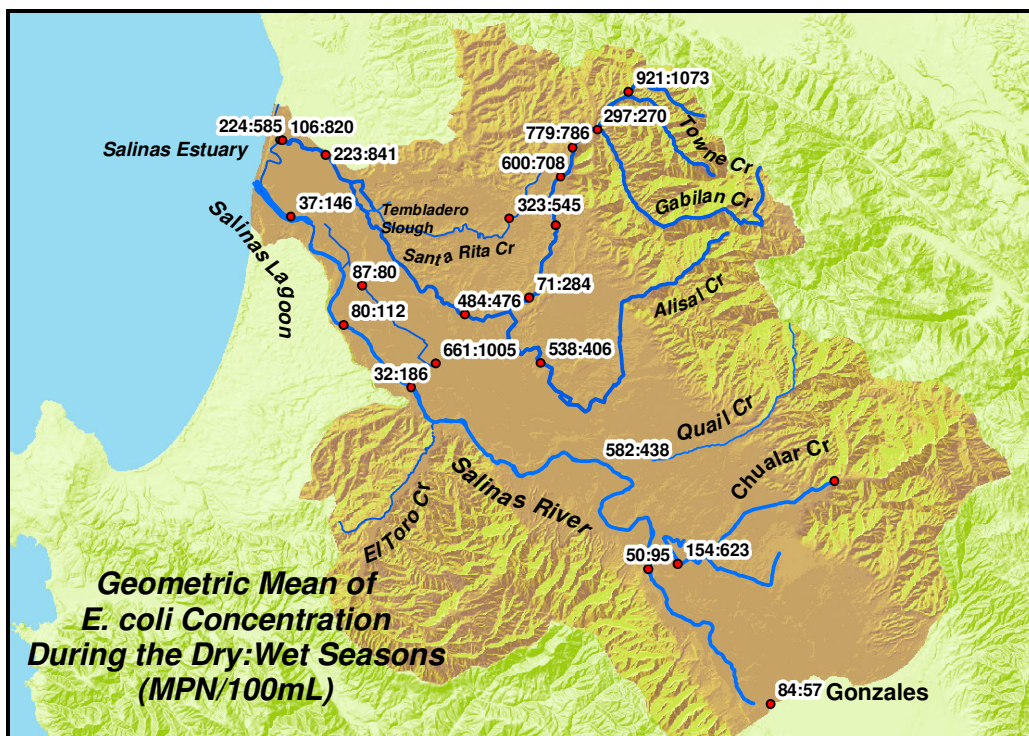


Figure 3-4 Geometric means during dry and wet seasons.

3.5. Presence of *E. coli* O157:H7

Staff reviewed the occurrence of *E. coli* O157:H7 as an indication of potential sources of *E. coli* O157:H7 as well as other pathogenic organisms. **Error! Reference source not found.** illustrates the number of samples at each site that had a positive identification for *E. coli* O157:H7. Note from the map that *E. coli* O157:H7 first occurred in the headwaters of the watershed.

Figure 3-5 represents all the data collected up to the date of this document preparation; this represents an update to the summary provided in the June 2006 Final Preliminary Project Report.

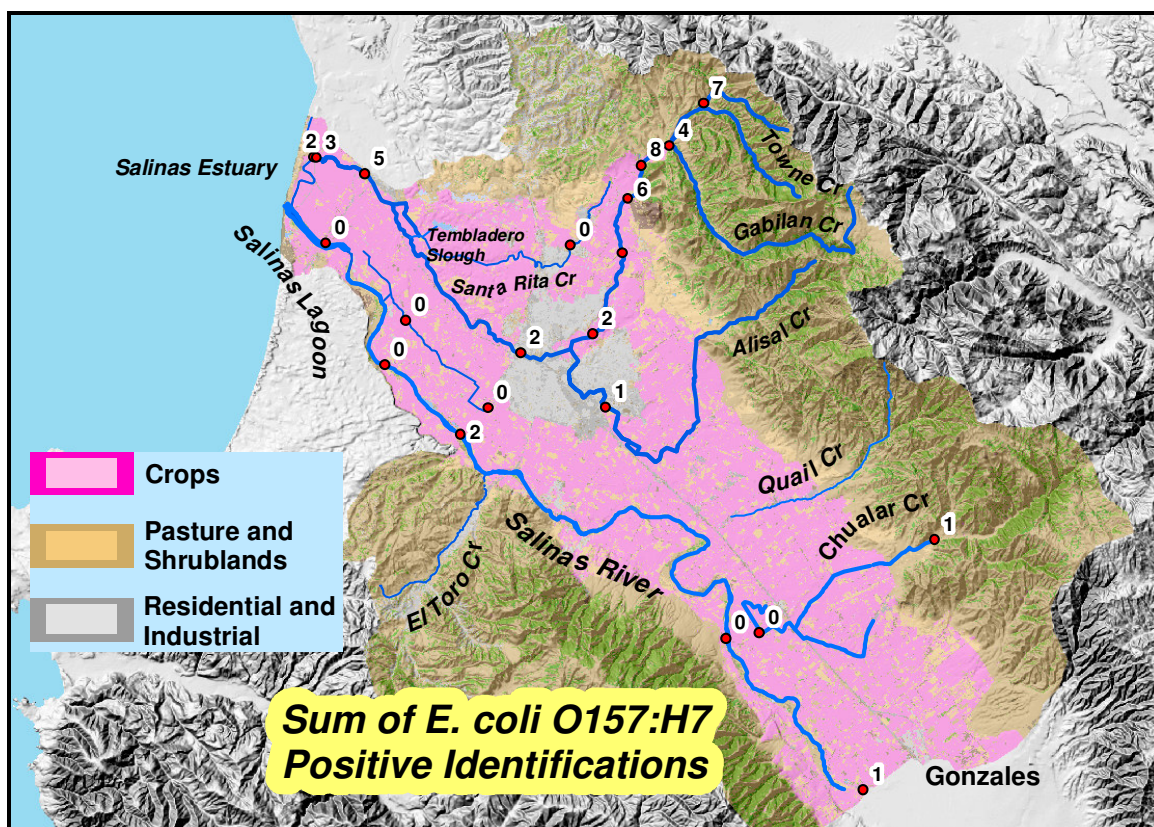


Figure 3-5 Sum of *E. coli* O157:H7 positives.

3.6. Data Analysis Summary

Figure 3-6 illustrates data and a corresponding graph showing the minimum, maximum, geometric mean, and number of data for each waterbody. Note that the data in Figure 3-6 is summary data only and was not meant to be compared with water quality objectives; the data was presented to give the reader a sense of relative concentrations of indicator bacteria in the project area.

Figure 3-6 represents all the data collected up to the date of this document preparation; this represents an update to the summary provided in the June 2006 Final Preliminary Project Report.

Waterbody	El Toro Cr	Towne Cr	Santa Rita Cr	Quail Cr	Chualar Cr	Rec. Canal	Alisal Cr
Maximum	5040	11370	4570	2300	30440	3090	12590
Minimum	860	201	30	100	5	76	2
Geometric Mean	1911	1104	526	520	510	480	477
No. of data	3	39	19	10	7	12	32

Waterbody	Gabilan Cr	Temb. Slough	Sal. Lagoon	Blanco Drain	Salinas River	Arroyo Seco R
Maximum	7590	10000	5200	1120	2700	11
Minimum	10	3	1	10	1	5
Geometric Mean	454	360	264	83	78	7
No. of data	100	78	72	19	104	4

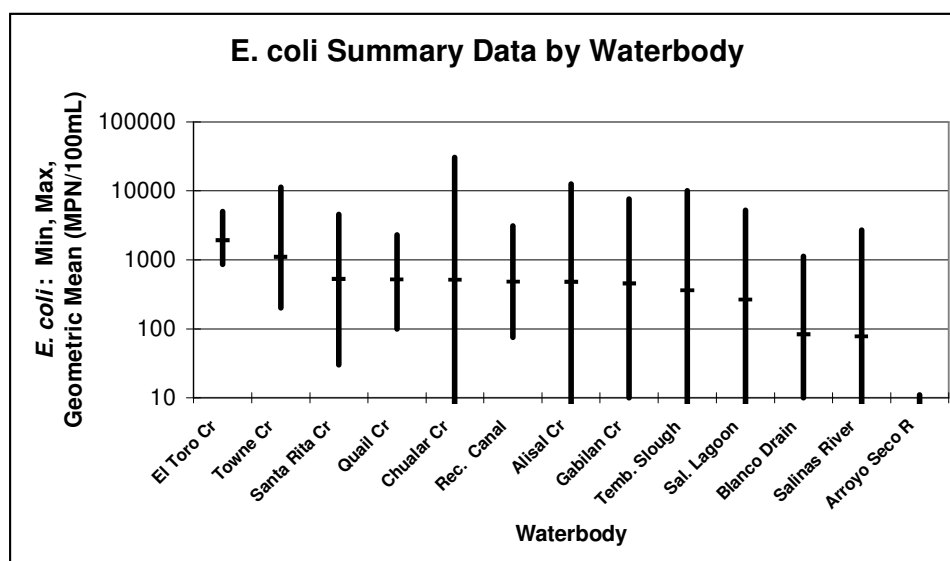


Figure 3-6 Summary data by water body.

Staff conducted a data analysis of all *E. coli* and fecal coliform data by water body. Staff assessed impairment using the numeric water quality objective for fecal coliform protecting water contact recreation (200 MPN/100mL.). For *E. coli* data, staff assessed impairment using the recommended USEPA criteria for *E. coli* (126 MPN/100mL). Staff batched data into dry and wet seasons for analysis (see Section 3 for discussion of dry and wet seasons).

The analysis in Table 3-2 represents all the data collected up to the date of this document preparation; this represents an update to the summary provided in the June 2006 Final Preliminary Project Report. Note that all the water bodies that were listed as impaired on the 303(d) list are confirmed to be impaired by the newest available data. These waterbodies are impaired due to exceedance of water quality objectives or recommended criteria protecting the water contact recreation beneficial use.

The following water bodies are not listed on the 303(d) list, and are not meeting water quality objectives or recommended criteria:

- Salinas River Lagoon
- Santa Rita Creek
- Quail Creek
- Chualar Creek
- El Toro Creek
- Towne Creek

Table 3-2 Confirmed impaired waterbodies

Waterbody	Exceeding a water quality objective or recommended level?	Water quality objective or recommended level exceeded?		Currently listed on 303(d) list?
		Fecal Coliform Objective	USEPA recommended <i>E. coli</i> level	
Lower Salinas River	YES	YES		Yes
Old Salinas River Estuary	YES	YES	YES	YES
Tembladero Slough	YES	YES	YES	YES
Salinas Rec. Canal	YES		YES	YES
Alisal Creek	YES	YES	YES	YES
Gabilan Creek	YES	YES	YES	YES

Staff made the following preliminary data analysis summary:

- All 303(d) listed waterbodies in the project area exceeded water quality objectives for indicator bacteria.
- Some waterbodies not currently listed also exceeded water quality objectives or USEPA recommended levels for indicator bacteria.
- The disease-causing strain of *E. coli* O157:H7 was isolated from samples drawn from several monitoring sites in the project area.
- *E. coli* O157:H7 was isolated more often from samples drawn in areas where livestock had access to surface waters, particularly in the Gabilan Creek watershed.
- Maximum *E. coli* concentrations occurred predominantly during wet season months.
- There was a trend of higher median indicator bacteria concentration during winter months.
- Water quality objectives and USEPA recommended levels for indicator bacteria were exceeded in all land use categories, including rural areas upstream of urban and agricultural lands.
- Evidence suggested that the elevated concentrations in agricultural areas were the result of indicator bacteria loading from upstream waters.

4. SOURCE ANALYSIS

Staff identified several sources of indicator bacteria through data analysis and information gathering. The Source Analysis for the Project is still being developed. Staff is still uncertain as to whether some of the suspected sources are causing or contributing to the exceedances of water quality objectives. Staff will obtain more information to help address these uncertainties as the Project continues.

The following sub-sections discuss suspected sources, and potential sources that have been ruled out, as causing exceedance of water quality objectives. A brief justification for these preliminary conclusions is included.

4.1. Natural Sources of Indicator Bacteria

Staff held an environmental scoping and public participation meeting in June 2007. As discussed in Section 1.4, stakeholders expressed concern that natural sources of indicator bacteria may exceed the target concentrations for this TMDL. Staff acknowledges that the concentration of indicator bacteria from natural sources may differ within the Project area, as well as seasonally. This phenomenon represents an uncertainty that staff will address, and will be reflected in future reports and communication with stakeholders.

Numerous wild animals are present in the Project area and are potential sources of indicator bacteria to surface waters. The animals that are likely contributors of indicator bacteria to surface waters in the project area include skunk, opossum, raccoon, deer, geese, turkey, egret, heron, as well as others.

DNA analysis was performed on samples drawn from surface waters near the Project area, but not in the Project area. The DNA analysis from other surface waters suggested that the contribution from natural sources, particularly birds, could have exceeded water quality objectives. However, this occurred seasonally, and typically in the lower portions of the watershed where birds were attracted to calm waters.

The Arroyo Seco River is a tributary to the Salinas River. The Arroyo Seco has a confluence with the Salinas River approximately one mile upstream of the City of Gonzales. The headwaters of the Arroyo Seco contain minimally impacted areas that closely reflect natural *E. coli* densities in headwaters areas in the area. Staff stresses that indicator bacteria concentration in the headwaters of the Arroyo Seco may not reflect natural concentrations in lower lying areas, e.g. the Salinas River Lagoon; however, they may shed light on natural concentrations in other

headwater areas of the Project area. Additionally, staff has evaluated data for other lagoons in the region that are influenced predominantly by birds and not by other sources and found indicator bacteria concentrations did not exceed water quality objectives.

Table 4-1 shows the data from the Arroyo Seco River monitoring site titled ARR-GOR. Note that the concentration of *E. coli* at this monitoring site was well below the USEPA recommended criteria of 126 MPN/100mL.

Table 4-1 Data from headwaters in the Arroyo Seco subwatershed.

Site ARR-GOR	<i>E. coli</i> MPN/100mL
04/18/06	15
05/15/06	11
8/22/06	5
10/10/06	5

4.2. Livestock

Many areas in the upper subwatersheds support grazing lands. Livestock had access to surface waters in some portions of the project area. Staff observed cattle in surface waters and along creek banks of the Gabilan subwatershed. Gabilan creek flowed throughout the years of 2005 and 2006, and exceedance of water quality objectives for indicator bacteria was common. *E. coli* O157:H7 was more prevalent in samples adjacent to areas where livestock had access to surface waters.

Cattle are known carriers of *E. coli* O157:H7, several samples drawn from the Gabilan Creek watershed were positive for this strain of *E. coli*. Multiple-Locus Variable-Number Tandem Repeat Analysis (MLVA) is a form of genetic typing of *E. coli*. The MLVA type of *E. coli* O157:H7 isolated from cattle feces collected from land in the Gabilan Creek watershed matched the MLVA type of *E. coli* O157:H7 isolated from a water sample drawn from Gabilan Creek in 2006.

In addition to large tracts of lands supporting grazing and livestock operations, some smaller parcels of land with single-family homes are used to raise farm animals, likely for personal use. The Monterey County Department of Health conducted three creek walks along a two mile reach of Santa Rita Creek. County Health staff noted several incidences of farm animal access and/or animal waste adjacent to Santa Rita Creek, a tributary to Tembladero Slough, from single family homes. Although the number of animals from the single family home operations was not great, the combined affect could have a significant impact on water quality. This information gave staff insight into a potentially more widespread problem of farm animal sources from “backyard livestock” owners.

Given the information discussed above, staff concluded that livestock are a source of indicator bacteria in the Project area.

4.3. Urban Sources

Staff had DNA fingerprinting analysis performed from water samples drawn from urban watersheds for other projects (TMDLs for San Lorenzo River and Watsonville Slough). Sources of indicator bacteria in urban channels typically included waste from wild animals, pets, and humans. These sources are collectively referred to as urban sources in this report.

In the Project watershed, staff observed numerous signs of waste from wild animals, pets, and humans along urban channels in the project area. Much of the animal and human waste in urban watersheds reached urban channels either through overland flow or through stormwater conduits.

Stormwater indicator bacteria levels in the project area were typically in excess of water quality objectives. Staff noted that this is not uncommon, as urban stormwater data from other areas also exceeded indicator bacteria standards.

Table 4-2 shows urban stormwater data collected in the Project area. Note that exceedance of the USEPA recommended criteria of 126 MPN/100mL was not uncommon.

Staff proposed that urban sources were a source of indicator bacteria causing exceedance of water quality objectives in the Project surface waters.

Table 4-2 Urban stormwater data

Site	Monitoring Date	E. coli (MPN/100mL)
SDR-PUM	12/7/2004	2420
SDR-PUM	1/12/2005	>2149
SDR-PUM	2/16/2005	1300
SDR-PUM	3/23/2005	2419
SDR-PUM	4/20/2005	765
SDR-PUM	7/26/2005	>2419
SDR-PUM	8/16/2005	>2419
SDR-PUM	10/25/2005	199
SDR-PUM	11/15/2005	676
SDR-PUM	12/13/2005	630
SDR-PUM	1/17/2006	100
SDR-PUM	2/22/2006	41
SDR-PUM	3/20/2006	14550
SDR-PUM	4/18/2006	3320
SDR-PUM	5/15/2006	100
SDR-PUM	6/19/2006	191
SDR-PUM	7/18/2006	1340
SDR-PUM	8/22/2006	630
SDR-PUM	10/10/2006	1950

Average/Max		1980/14550
Geometric Mean		843

4.4. Illegal Dumping

The Monterey County Department of Health conducted three two-mile creek walks along Santa Rita Creek. County Health staff noted and photographed eleven incidences of solid waste dumping along the two-mile reach investigated. Central Coast Water Board staff also encountered dumping sites along and in surface waters in the Watershed. On one occasion, staff observed soiled baby diapers dumped in Gabilan Creek.

City of Salinas staff witnessed owner/operators of motorized recreational vehicles discharging domestic sewage waste into surface waters (personal communication, 6February2007). Other city staff corroborated this testimony.

Solid waste dumping along surface water areas was prevalent in the Project area. The extent and magnitude of this source relative to other sources is not known.

Staff proposed that illegal dumping is a potential source of indicator bacteria causing exceedance of water quality objectives in the Project surface waters.

4.5. Homeless People

There was a homeless population in the project area. In some cases, homeless encampments were built along creek systems. Sanitary conditions among the homeless varied widely. In some cases, encampments were somewhat elaborate, with designated areas for bathroom activities. However, in other cases, surface waters were used for bathroom activities.

Staff obtained photographs of homeless encampments in the Project area, specifically along Natividad Creek, a tributary to Gabilan Creek. The photos indicated that there was a significant population of people living along surface waters without bathroom facilities.

Staff observed many signs of homeless activity while conducting field investigations. Human fecal matter was not uncommon along the banks of some waterways.

Estimating the contribution of indicator bacteria from homeless people to surface waters was difficult and likely variable. However, it was probable that the homeless population played a role in the contribution from human sources of indicator bacteria in the Project area. Therefore, staff concluded that homeless people are a source of indicator bacteria in the Project area.

4.6. Spills and Leaks from Municipal Sewage Collection Systems

There are several regulated entities treating wastewater in the project area. The collection systems are also regulated.

Regulated dischargers are required to report sewage spills to the Central Coast Water Board. Along with other information, the volume of the spill and whether the spill reached surface waters is reported. If a spill occurs, spilled material is typically contained and disinfected as soon as possible.

Staff reviewed spill reports from 2004 to present. Based on the information available at the time of this report, sewage spills and leaks did appear to be a source causing exceedance water quality objectives in the Project area. However, there was some uncertainty as one of the facilities was not required to monitor bacteria due to the nature of the waste water (there was not a sewage source). Staff will investigate this uncertainty.

4.7. Onsite Waste Disposal Systems

Many residents in county areas have onsite septic systems. An unknown proportion of these reside near surface waters.

Monterey County Department of Health regulates the issuance of new permits for septic systems and is responsible for investigating failing systems. However, municipalities typically do not have the resources to investigate existing systems, unless the existing system is suspected of failing or the property owner has made application for new development.

Of particular concern to staff was the Bolsa Knowles area adjacent to the City of Salinas. The Bolsa Knowles area is a 30-50 year old housing tract adjacent to the City of Salinas along Santa Rita Creek. The homes in this area are on individual septic systems. Monterey County Department of Health staff (County staff) conducted a two mile creek walk along Santa Rita Creek, but did not find any failing septic systems; the County staff conducting the creek walk had extensive experience inspecting septic systems.

Given the current information, staff concluded that septic systems are not a source of indicator bacteria in the Project area causing exceedance of water quality objectives. However, staff working in other watersheds found information indicating that this source category could not be eliminated from those watersheds. Therefore, staff will continue to monitor efforts in those watersheds, as well as invite information pertaining to this project, in an effort to eliminate uncertainties regarding this source.

4.8. Irrigated Agriculture

The intensity of focus on irrigated agriculture since the *E. coli* O157:H7 outbreak associated with spinach led staff to carefully consider whether this land use activity could be a source of indicator bacteria.

Staff concluded that discharges from irrigated lands in the Project area did not cause an exceedance of water quality objectives related to indicator bacteria. Consider the following evidence.

Blanco Drain is surrounded by irrigated lands. Discharges to Blanco drain are almost entirely from overland flow or return waters from irrigated croplands. The geometric mean of both wet and dry season *E. coli* concentration in Blanco drain were within the USEPA recommended concentration of 126 MPN/100mL. Figure 4-1 illustrates the dry and wet season geometric means at the Blanco Drain monitoring site. Note that the dry season and wet season geometric mean for *E. coli* was 87 and 80 MPN/100mL, respectively.

Also note from Figure 4-1 that there are two monitoring sites along Tembladero Slough. The most upstream site is located in the City of Castroville, and the downstream site is near the confluence of Tembladero Slough and the Salinas River Estuary. Land use between these two monitoring sites is almost exclusively irrigated croplands, yet there was not an increase in the geometric mean of *E. coli* at the downstream site, neither during the wet nor dry season. Staff noted a similar pattern in other areas of the watershed.

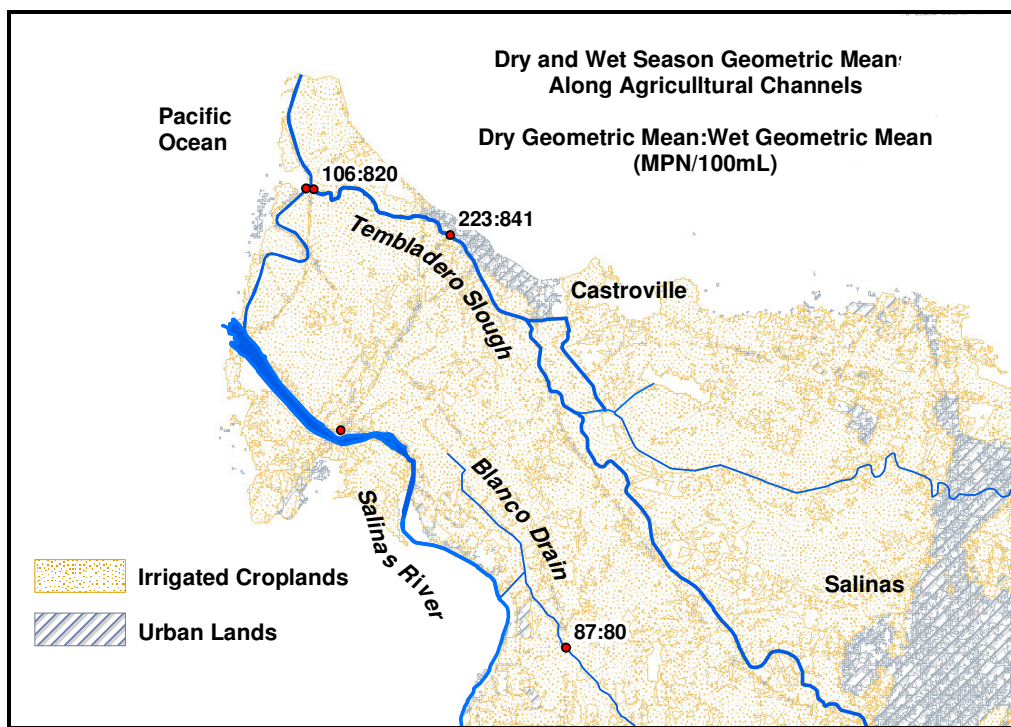


Figure 4-1 Dry and wet geometric mean of *E. coli* at Blanco Drain and Tembladero Slough.

Growers in the project area are highly aware of food safety issues; their livelihood depends on providing a crop that is safe for consumers. As such, growers practice methods that minimize the potential of crop contamination. One method is the use of well water and/or recycled water for irrigation purposes. Both well and recycled water carries very low (less than 10 MPN/100mL), or zero concentration, of indicator bacteria. Therefore, overland flow from irrigated lands to surface waters originates largely from well or recycled water. Any indicator

bacteria discharged to surface waters from croplands, therefore, would likely originate from the land itself.

Growers carry the food safety concern to land and field practices. Staff conducted reconnaissance in the project area for a period of two years, and did not document land or field practices that would result in a controllable discharge of indicator bacteria to surface waters. Specifically:

- Staff noted that portable toilets were provided when field crews were present.
- Staff did not find evidence of manure applications on fields; the project area is dominated by inorganic farming.
- Staff did not see evidence of human waste along surface waters adjacent to agricultural lands; portable toilets were used.

Staff witnessed good agricultural practices in the project area, which in turn helped minimize loading of indicator bacteria in surface waters. Exceptions to the good agricultural practices could have occurred in the project area. However, based on staff's observations, exceptions, if any, were infrequent and not widespread.

Therefore, staff concluded that discharges from irrigated lands in the Project area did not cause exceedance of water quality objectives related to indicator bacteria.

4.9. Summary of Sources

Table 4-3 shows the summary of identified sources of indicator bacteria in the Project area. Staff listed the identified sources by source category and the source organisms likely contributing to that category.

Table 4-3 Summary of identified sources of indicator bacteria.

Source Category	Source Organism(s)
Background (natural)	Examples include: wild pigs, skunk, opossum, birds (including fowl), and deer.
Livestock	Examples include: cattle, horses, goats, sheep, chickens.
Urban Sources	Dogs, cats, humans.
Illegal Dumping	Probable sources: humans and pets.
Homeless People	Humans

5. CRITICAL CONDITIONS AND SEASONAL VARIATION

Seasonal variation of indicator bacteria density typically occurs in surface waters. Although impairment in the Project area occurred in all seasons, maximum levels of indicator bacteria typically occurred during and following rain events. Therefore, loading was greatest during wet weather.

Indicator bacteria may survive in the sediment for several months. Therefore, there may be a lag-affect between bacterial loading and resulting water column density; summer loading could affect winter water column indicator bacteria density. As such, allocations to achieve non-impairment will need to account for this lag-affect.

Staff is still uncertain about the contribution of natural sources in space and time in the Project area; there may have been more or less contribution of natural sources on a seasonal basis as well as location in the watershed. The uncertainty is most critical if the natural contribution exceeds water quality objectives, which will be used to establish the TMDL and allocations.

Although uncertainties exist, the TMDL is expressed in terms of constant concentration throughout the year. Therefore, management measures will likely have to be similar throughout the year to achieve the TMDL and water quality objectives.

6. NUMERIC TARGET

A numeric target is a measurable value that, if achieved, will result in attainment of a water quality objective.

The numeric targets for this TMDL are based on both the USEPA recommended concentration for *E. coli* as well as the current Basin Plan objective for fecal coliform.

The numeric target for generic *E. coli* numeric target is:

The geometric mean density of E. coli shall not exceed 126 MPN/100mL, based on a minimum of not less than five samples collected during any 30-day period.

The numeric target for fecal coliform is:

Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200/100mL, nor shall more than ten percent of total samples during any 30-day period exceed 400/100mL.

Staff selected these numeric targets based on the assumption that the shellfish harvesting beneficial use will be removed. The indicator bacteria water quality objectives for shellfish harvesting are stricter than the proposed numeric targets, but unnecessary if that beneficial use is found inappropriate and removed.

7. LINKAGE ANALYSIS

The linkage analysis addresses the relationship between pollutant loading (*E. coli*) and water quality response (*E. coli* density, e.g. MPN/100mL). The source analysis and numeric targets address the pollutant in terms of water quality response, and not mass loading. Consequently, by expressing the TMDL in terms of water quality response, and not mass loading, there is a direct linkage between pollutant loading and the resulting water quality response (*E. coli* density)..

8. TMDL CALCULATION AND ALLOCATIONS

The following water bodies, currently listed on the 303(d) List, will be assigned TMDLs:

1. Lower Salinas River (from the crossing at Gonzales Road bridge, downstream to the Salinas River Lagoon)
2. Old Salinas River Estuary (the entire Estuary)
3. Tembladero Slough (the entire Slough)
4. Salinas Reclamation Canal (the entire Reclamation Canal)
5. Alisal Creek (the entire Creek)
6. Gabilan Creek (the entire Creek)

The following water bodies, not currently listed on the 303(d) List, will also be assigned TMDLs:

- Salinas River Lagoon
- Santa Rita Creek
- Quail Creek
- Chualar Creek
- El Toro Creek
- Towne Creek

These waters are assigned the following TMDLs:

Discharges may not cause receiving water concentration of E. coli to exceed the following:

The geometric mean density of E. coli shall not exceed 126 MPN/100mL, based on a minimum of not less than five samples collected during any 30-day period.

Discharges may not cause receiving water concentration of fecal coliform to exceed the following:

Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200/100mL, nor shall more

8.1. Wasteload and Load Allocations

Table 8-1 shows wasteload and load allocations to responsible parties associated with the waterbodies and sources of indicator bacteria identified. All the allocations are equal to the TMDLs, which are expressed as receiving water concentrations.

Table 8-1 Wasteload and Load allocations.

Waterbodies to which allocation(s) apply	Responsible Party	Source Category/ (Load/Wasteload Allocation)	Allocation (fecal coliform and E. coli MPN/100mL)
Controllable Sources			
1) All of Gabilan Cr. and its tributaries 2) All of Alisal Cr.	Operators or owners of grazing lands, livestock facilities, and farm animals	Livestock (Load Allocation)	▪ Equal to the TMDLs
The portions of the following waterbodies occurring in the Salinas City limits: 1) Gabilan Cr. 2) Alisal Cr. 3) Salinas Reclamation Canal	City of Salinas (NPDES No. CA5049981)	Urban Sources (Wasteload Allocation)	▪ Equal to the TMDLs
All six listed waterbodies	Monterey Regional Group (NPDES No. S000004)	Urban Sources (Wasteload Allocation)	▪ Equal to the TMDLs
All six listed waterbodies	Land owners of illegal dump sites	Illegal dumping (Wasteload Allocation)	▪ Equal to the TMDLs
1) Lower Salinas River 2) Gabilan Creek and its tributaries 3) Salinas Reclamation Canal 4) Tembladero Slough	Land owners with homeless encampments	Homeless people (Load Allocation)	▪ Equal to the TMDLs
Uncontrollable Sources			
All six listed waterbodies	None	Natural (Load Allocation)	▪ Equal to the TMDLs

Staff will also assign allocations to responsible parties for these sources contributing to the other waterbodies with TMDLs proposed, that are impaired but not currently listed on the 303(d) List.

8.2. Margin of Safety

The margin of safety is a required component of the TMDL that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving water (CWA 303(d)(1)(C)). For this TMDL, a margin of safety was implicitly established through the use of protective numeric targets.

The uncertainties between the pollutant loading and water quality response stem largely from the uncertainties of sources of indicator bacteria. For example, staff observed illegal dumping throughout the Project area, but the level of indicator bacteria loading from illegal dumping was largely unknown. Additionally, questions about the extent of loading from natural sources remain.

There is widespread speculation that indicator bacteria may have a longer survival (relative to natural conditions) in nutrient and sediment rich channels holding agricultural return waters. Some stakeholders speculated that indicator bacteria could significantly multiply in nutrient rich sediment. At the time of this report preparation, this speculation could not be defended or refuted, and was therefore an uncertainty.

Although uncertainties exist, the nature of a density (or concentration) based TMDL and allocations account for uncertainties insofar as indicator bacteria loading, from known and unknown sources alike, cannot be such that the resulting water quality exceeds the TMDL. This approach, along with adaptive management strategy towards achieving the TMDL, accounts for the nexus between pollutant loads and resulting water quality.

The *E. coli* numeric targets for this TMDL were set equal to the USEPA recommended level and existing water quality objectives for fecal coliform protecting water contact recreation. The USEPA recommended levels for *E. coli* and existing water quality objectives for fecal coliform were established with the knowledge of predicted and acceptable risk. Since the numeric targets were set equal to the levels, and the recommended levels carry calculated and acceptable risk, the TMDLs have an implicit margin of safety.

9. PUBLIC PARTICIPATION

Staff conducted stakeholder outreach efforts throughout the Project inception. Staff worked with county, state, and federal agencies during the data collection and data analysis phases. Results of coordinated efforts were publicized in newspapers and television media.

Staff made several presentations during the development of the TMDL. Attendees of the presentations included representatives from the following:

- United Fresh Fruit and Vegetable Association
- Monterey County Department of Environmental Health
- State of California Department of Health Services
- United States Department of Agriculture
- United States Food and Drug Administration

Staff conducted a California Environmental Quality Act (CEQA) stakeholder scoping meeting on June 20, 2007. Staff addressed questions and comments from attendees.

Staff intends to hold another public participation meeting in the fall of 2007.

Staff will also inform stakeholders of their right to submit written comment during the formal comment period before the Regional Board hearing of the TMDL.

10. IMPLEMENTATION AND MONITORING

The authority to require actions to implement and monitor the TMDL will likely be based on existing and proposed regulatory mechanisms. Staff recommended the following actions be developed or modified as part of the TMDL implementation:

1. Owners of grazing lands, livestock facilities, and backyard livestock owners should implement management measures and reporting as part of waste discharge requirements (WDRs), waivers of WDRs, or prohibitions to comply with the state's Nonpoint Source Policy.
2. The City of Salinas and the Monterey Regional Group should specifically target reduction of indicator bacteria in their Storm Water Management Plans.
3. Monterey County Health Department, Division of Environmental Health should continue, and if necessary, enhance, their proactive program to alleviate illegal dumping and report progress to the Water Board.
4. The County of Monterey, the City of Salinas, and private landowners of homeless encampments should identify and implement management measures in an effort to eliminate human waste from entering surface waters.

Any responsible parties required to implement actions as listed above, may also be required to conduct monitoring. Any monitoring requirements will be described in the regulatory mechanisms used to require implementation actions (e.g., permits, and/or regulatory mechanisms consistent with the NPS policy) or through other mechanisms to require monitoring (e.g., monitoring orders issued by the executive officer pursuant to Section 13267 of the CA Water Code). Monitoring may also be conducted by third party, technical assistance or nonprofit organizations through grant funds. Staff anticipates that the following types of monitoring will be required:

- Indicator bacteria monitoring of water bodies assigned an allocation.
- Monitoring of management measures aimed at achieving the allocations and TMDL (e.g., implementation progress and effectiveness).

Water Board staff will conduct triennial reviews of implementation progress and water quality monitoring data to assess progress towards achieving the TMDL.

11. MONITORING PLAN

This is a placeholder for more specific information regarding monitoring. This information will be described in more detail in subsequent reports.

REFERENCES CONSIDERED

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<p>APPENDIX A: SUMMARY OF USE ATTAINABILITY ANALYSIS FOR THE SALINAS RIVER LAGOON, SALINAS RIVER ESTUARY, AND THE TEMBLADERO SLOUGH</p>

**SUMMARY OF
USE ATTAINABILITY ANALYSIS FOR
SALINAS RIVER LAGOON
SALINAS RIVER ESTUARY
TEMBLADERO SLOUGH
IN
MONTEREY COUNTY, CALIFORNIA**

California Regional Water Quality Control Board, Central Coast Region
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1. INTRODUCTION

Use classifications, also known as beneficial uses under California law, are “uses specified in water quality standards for each water body or segment whether or not they are being attained” (40 CFR §131.3(f)).

States must protect beneficial uses of water bodies unless the state demonstrates that the use(s) are not attainable. To remove a beneficial use designation, a use attainability analysis (UAA) must be conducted. The UAA must demonstrate that at least one of six factors described in 40CFR131.10(g) are met. The six factors are as follows:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place, or
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses, or
6. Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

State may NOT remove an existing designated use.

- “Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.” 40CFR131.3(d)

Therefore, to de-designate a beneficial use from a water body, the state must:

1. Demonstrate that the use has not been an existing use since November 28, 1975.
 - This includes demonstration that the use was not exercised, and
 - Demonstration that water quality did not support the use.
2. Demonstrate that one of the six factors described above apply.

The Salinas River Lagoon, the Salinas River Estuary, and Tembladero Slough are designated to support the shellfish harvesting beneficial use (SHELL). The SHELL beneficial use is defined as:

Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial or sport purposes. This includes waters that have in the past, or may in the future, contain significant shellfisheries.

Water Board staff is proposing to remove the SHELL beneficial use from the Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough. The justification for removal of the SHELL beneficial use is described below.

2. DESCRIPTION OF WATER BODIES

The Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough are located in the lower Salinas River Watershed, as illustrated in Figure 3.

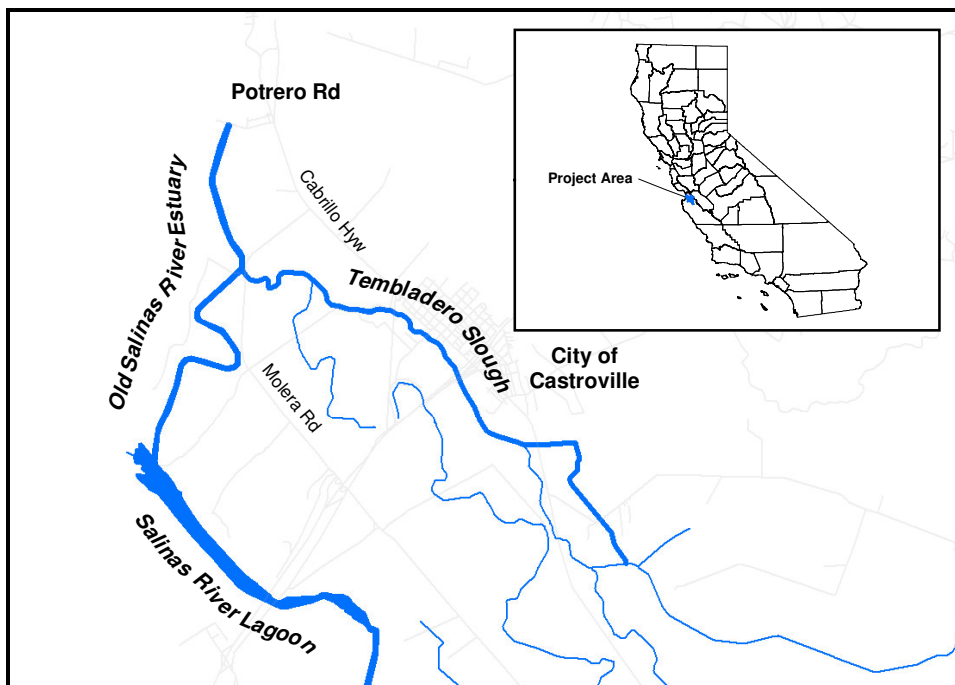


Figure 3 Location of Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough

3. METHODOLOGY

Staff used the following steps to determine whether to support the proposal of de-designation of the SHELL beneficial use:

1. Determine whether the designated use has been exercised since November 28, 1975.
2. Determine whether water quality in the designated water bodies has supported the SHELL beneficial use since 1975.
 - a. If no, consider whether the water quality condition could be compensated by effluent discharges without violating water conservation requirements?
3. Determine what factors preclude attainment of the SHELL beneficial use.
4. Consider whether restoration in the designated water bodies is an option to support the beneficial use.

4. DATA AND INFORMATION

Indicator bacteria water quality objectives to protect the SHELL beneficial use.

The Basin Plan numeric water quality objective for the protection of the SHELL beneficial use is:

At all areas where shellfish may be harvested for human consumption, the median total coliform concentration throughout the water column for any 30-day period shall not exceed 70/100 mL, nor shall more than 10% of the samples collected during any 30-day period exceed 230/100 mL for a five-tube decimal dilution test or 330/100 mL when a three-tube decimal dilution test is used.

The Department of Health Services standards for the protection of the shell fishing beneficial use are:

- i. The total coliform median or geometric mean MPN of the water does not exceed 70 per 100 mL and not more than 10 percent of the samples exceed a MPN of 230 per 100 mL for a five-tube decimal dilution test.*
- ii. The fecal coliform median or geometric mean MPN of the water does not exceed 14 per 100 mL and not more than 10 percent of the samples exceed a MPN of 43 for a five-tube decimal dilution test.*

In California, Department of Health Services (DHS) uses the fecal coliform standard most often to classify growing areas (as opposed to total coliform).

Staff chose to use the DHS standards of fecal coliform concentrations for the beneficial use of shell fishing for the UAA analysis because they are the most conservative and are the most protective of the shell fishing beneficial use.

Is shell fishing an existing beneficial use?

Staff engaged in activities to determine whether the shell fishing beneficial use is or has been occurring since November 28, 1975. The information staff obtained is contained in an unpublished document available at the Water board (Watson *et al*, 2006).

The following activities were conducted to determine whether the shell fishing beneficial use has occurred since November 28, 1975:

- Telephone interviews
- Literature search
- Public postings at access areas requesting information
- Web posting requesting information
- Site monitoring

Based on the information obtained from these activities, staff had no evidence that shell fishing has occurred in the Salinas River Lagoon, Salinas River Estuary, or Tembladero Slough since November 28, 1975.

Has water quality supported the shell fishing beneficial use since November 1975?

Staff compiled data from the Central Coast Ambient Monitoring Program database. In addition, staff compiled historic data from EPAs STORET database (<http://www.epa.gov/storet/dbtop.html>). The CCAMP dataset included data ranging from 1999 to 2006. The STORET data included data from 1975 and 1977.

Data indicated that indicator bacteria concentrations in the Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough were in excess of objectives needed to support the shell fishing beneficial use since, or before, November 28, 1975.

5. COULD THE CURRENT WATER QUALITY CONDITION BE MITIGATED WITH EFFLUENT?

The Salinas River Lagoon, Salinas River Estuary, and the Tembladero Slough are not effluent dominated water bodies. In addition, other factors, other than water quality, preclude these water bodies from supporting a viable shellfish population for consumption.

Factors precluding attainment of the beneficial use.

The physical conditions, particularly flow and substrate, of the Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough preclude attainment of significant shellfisheries, as well as shell fishing activities.

Salinity in Tembladero Slough is dominated by fresh water. There is periodic tidal influence resulting in elevated salinity, reaching as high as 6.32 parts per thousand (seawater is generally 35 parts per thousand). Corbicula (Asian clam) is a freshwater clam that could potentially survive in the salinity environment of Tembladero Slough, but there was no information to suggest this clam was present.

Tembladero Slough is a deep channel slough with deep fine substrate. The channel depth (water depth) and substrate is not conducive to shellfish habitat. In addition, water depth and substrate (deep mud), is not conducive to shell fishing activity.

The Salinas River Estuary is blocked from direct connection to Moss Landing Harbor via tide gates. Consequently, salinity can fluctuate dramatically. Many clam species are sensitive to salinity and temperature changes, particularly during larval stages.

The Salinas River Estuary is a deep channel with fine substrate. Water depth and mud substrate are not conducive to clam survival, nor are they conducive to shell fishing activities.

The Salinas River Lagoon is dominated by freshwater inputs. Habitat in the Salinas River Lagoon would be most conducive for fresh water clams, e.g. Corbicula (Asian clam). However, there was no information to suggest that the Asian clam was present.

The Salinas River Lagoon is a deep channel with fine substrate. The water depth and mud substrate is not conducive to shell fishing activities.

6. IS RESTORATION A FEASIBLE OPTION TO SUPPORT THE SHELL FISHING BENEFICIAL USE?

Staff concluded that restoration is not a feasible option as an effort to support the shell fishing beneficial use.

To support the shell fishing beneficial use in the Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough, significant hydrologic and terrestrial changes would need to be made to create suitable habitat and fishing grounds.

Additionally, literature from the early twentieth century indicated that shellfish species commonly consumed by humans were not prevalent in these waterbodies, although they were present in nearby waterbodies, e.g. Elkhorn Slough (Weymouth, 1920). Therefore, it is unlikely that restoration efforts, even if attempted, would result in a viable shellfish population.

7. STAFF RECOMMENDATION

Staff is recommending that the shellfish beneficial use (SHELL), be removed as a beneficial use from the Salinas River Lagoon, Salinas River Estuary, and Tembladero Slough.

8. CONSIDERATIONS

If the shell fishing beneficial use is removed from these water bodies, the applicable numeric target for the TMDL will be those described in the “Proposed Numeric Target” section, page 11.

If the shell fishing beneficial use is not removed from these water bodies, it is likely that the applicable numeric target for the TMDL will be stricter than those proposed in the “Proposed Numeric Target” section on page 11; the more strict targets protecting the shell fishing beneficial use are described in the “Data and Information” section of this Appendix on page iv.

APPENDIX B: FULL DATASET

CCOWSCODE	Date	TCOLI MPN/100mL	ECOLI MPN/100mL	FCOLI MPN/100mL	O157YN
TOW-OSR4	6/19/2006		2247		0
TOW-OSR4	7/18/2006		8010		0
TOW-OSR4	8/22/2006		1220		0
TOW-OSR4	10/10/2006		350		1
TOW-OSR3	4/18/2006		201		0
TOW-OSR3	5/15/2006		8860		1
TOW-OSR2	4/18/2006		295		0
TOW-OSR2	5/15/2006		1560		0
TOW-OSR2	6/19/2006		691		0
TOW-OSR2	7/18/2006		2130		0
TOW-OSR2	8/22/2006		860		1
TOW-OSR2	10/10/2006		980		1
TOW-OSR1.5	7/18/2006		11370		1
TOW-OSR1	6/19/2006		836		1
TOW-OSR1	8/22/2006		1100		1
TOW-OSR1	10/10/2006		459		1
TOW-OSR	12/07/04	2420	2420		
TOW-OSR	01/12/05	2420	687		
TOW-OSR	02/16/05	2420	1986		
TOW-OSR	03/23/05	2419	2419		
TOW-OSR	04/20/05	3130	638		0
TOW-OSR	06/20/05	291	291		0
TOW-OSR	07/26/05	2419	866		0
TOW-OSR	08/16/05	2419	365		0
TOW-OSR	10/25/2005		1120		0
TOW-OSR	11/15/2005		1119		0
TOW-OSR	11/30/2005		ND		1
TOW-OSR	12/13/2005		750		0
TOW-OSR	12/19/2005		ND		0
TOW-OSR	1/4/2006		440		0
TOW-OSR	1/17/2006		689		0
TOW-OSR	2/22/2006		364		1
TOW-OSR	3/7/2006		4040		1
TOW-OSR	3/20/2006		384		1
TOW-OSR	4/5/2006		4870		1
TOW-OSR	4/18/2006		754		1
TOW-OSR	5/15/2006		1310		0
TOW-OSR	6/19/2006		1153		0
TOW-OSR	6/19/2006		ND		0
TOW-OSR	7/18/2006		2030		0
TOW-OSR	8/22/2006		970		1
TOW-OSR	10/10/2006		1560		0
TEM-SJR	5/15/2006		52		0
TEM-SJR	6/19/2006		279		0

TEM-SJR	7/18/2006		411		0
TEM-SJR	8/22/2006		630		0
TEM-SJR	10/10/2006		134		0
TEM-PRE	04/26/99			1400	
TEM-PRE	06/01/99			500	
TEM-PRE	06/28/99			900	
TEM-PRE	07/26/99			30	
TEM-PRE	11/01/99			490	
TEM-PRE	12/06/99			240	
TEM-PRE	01/10/00			240	
TEM-PRE	02/07/00			2300	
TEM-PRE	12/07/04	2420	2419		
TEM-PRE	01/12/05	2420	2420		
TEM-PRE	02/16/05	2420	2420		1
TEM-PRE	03/23/05	2419	2419		1
TEM-PRE	04/20/05	24192	373		0
TEM-PRE	06/20/05	3968	345		0
TEM-PRE	07/26/05	24192	325		0
TEM-PRE	08/16/05	2419	461		0
TEM-PRE	10/25/2005		74		0
TEM-PRE	11/15/2005		161		0
TEM-PRE	12/13/2005		84		0
TEM-PRE	1/4/2006		3800		0
TEM-PRE	1/17/2006		400		0
TEM-PRE	1/23/2006	160001	200	240	
TEM-PRE	2/22/2006		20		0
TEM-PRE	2/27/2006	30000	2800	30000	
TEM-PRE	3/7/2006		1610		0
TEM-PRE	3/20/2006		1450		1
TEM-PRE	3/28/2006	5000	1900	2400	
TEM-PRE	4/5/2006		8820		1
TEM-PRE	4/18/2006		970		1
TEM-PRE	4/25/2006	160000	400	800	
TEM-PRE	5/15/2006		200		0
TEM-PRE	5/23/2006	5000	120	3000	
TEM-PRE	6/19/2006		185		0
TEM-PRE	6/21/2006	500	280	800	
TEM-PRE	7/18/2006		74		0
TEM-PRE	7/19/2006	17000	280	500	
TEM-PRE	8/15/2006	24000	390	800	
TEM-PRE	8/22/2006		410		0
TEM-PRE	9/20/2006	30000	200	300	
TEM-PRE	10/10/2006		520		0
TEM-PRE	10/18/2006		100	1300	
TEM-MOL	04/26/01			170	
TEM-MOL	05/31/01			9200	
TEM-MOL	06/28/01			3500	
TEM-MOL	07/25/01			1300	
TEM-MOL	08/30/01			2300	

TEM-MOL	09/18/01			1300	
TEM-MOL	10/16/01			3500	
TEM-MOL	11/13/01			54000	
TEM-MOL	12/20/01			500	
TEM-MOL	01/21/02			230	
TEM-MOL	02/25/02			49	
TEM-MOL	03/18/02			3500	
TEM-MOL	04/15/02			170	
TEM-MOL	05/13/02			110	
TEM-MOL	06/17/02			240	
TEM-MOL	07/17/02			130	
TEM-MOL	08/14/02			80	
TEM-MOL	09/11/02			500	
TEM-MOL	10/09/02			800	
TEM-MOL	11/12/02			230	
TEM-MOL	12/11/02			17000	
TEM-MOL	12/11/02			17000	
TEM-MOL	02/10/03			50	
TEM-MOL	03/11/03			70	
TEM-MOL	03/01/04			900	
TEM-MOL	03/29/04			500	
TEM-MOL	05/17/04			500	
TEM-MOL	06/21/04			500	
TEM-MOL	08/03/04			240	
TEM-MOL	12/07/04	2420	1986		
TEM-MOL	1/11/2005	7000	10000	7000	
TEM-MOL	01/12/05	2420	2420		
TEM-MOL	2/7/2005	8000	130	70	
TEM-MOL	02/16/05	2420	2420		1
TEM-MOL	3/9/2005	160000	230	300	
TEM-MOL	03/23/05	2419	2419		1
TEM-MOL	4/5/2005	9000	1900	5000	
TEM-MOL	04/20/05	24192	233		0
TEM-MOL	5/3/2005	7000	200	140	
TEM-MOL	6/1/2005	2200	150	230	
TEM-MOL	06/20/05	7215	74		0
TEM-MOL	6/28/2005	1700	30	170	
TEM-MOL	07/26/05	2419	111		0
TEM-MOL	8/2/2005	9000	10	300	
TEM-MOL	08/16/05	2419	210		0
TEM-MOL	8/30/2005	16000	3	500	
TEM-MOL	9/28/2005	3000	300	900	
TEM-MOL	10/25/2005		110		0
TEM-MOL	10/26/2005	7000	310	140	
TEM-MOL	11/15/2005		122		0
TEM-MOL	11/21/2005	50000	440	270	
TEM-MOL	12/13/2005		630		0
TEM-MOL	12/19/2005		ND		0
TEM-MOL	12/20/2005	9000	2500	5000	

TEM-MOL	1/4/2006		3100		0
TEM-MOL	1/17/2006		3360		0
TEM-MOL	1/23/2006	35000	520	700	
TEM-MOL	2/22/2006		62		0
TEM-MOL	2/27/2006	24000	200	2200	
TEM-MOL	3/7/2006		1600		0
TEM-MOL	3/20/2006		246		0
TEM-MOL	3/28/2006	17000	3300	3000	
TEM-MOL	4/18/2006		850		1
TEM-MOL	4/25/2006	160000	440	700	
TEM-MOL	5/15/2006		520		0
TEM-MOL	5/23/2006	5000	2700	5000	
TEM-MOL	6/19/2006		41		0
TEM-MOL	6/21/2006	5000	-50	170	
TEM-MOL	7/18/2006		-10		0
TEM-MOL	7/19/2006	9000	630	800	
TEM-MOL	8/15/2006	3000	310	300	
TEM-MOL	8/22/2006		300		0
TEM-MOL	9/20/2006	5000	83	130	
TEM-MOL	10/10/2006		41		0
TEM-MOL	10/18/2006	30000	520	240	
SRC-RUS	5/15/2006		2160		0
SRC-RUS	6/19/2006		1071		0
SRC-RUS	7/18/2006		200		0
SRC-RUS	8/22/2006		ND		0
SRC-RUS	10/10/2006		ND		0
SRC-HOR	3/20/2006		1220		0
SRC-HOR	5/15/2006		4570		0
SRC-HEB	5/15/2006		ND		0
SRC-CTY	06/20/05	24192	980		0
SRC-COR	06/20/05	2419	1732		0
SRC-COR	07/26/05	5794	51		0
SRC-COR	08/16/05	2419	1968		0
SRC-COR	10/25/2005		30		0
SRC-COR	11/15/2005		206		0
SRC-COR	11/30/2005		ND		0
SRC-COR	12/13/2005		201		0
SRC-COR	12/19/2005		ND		0
SRC-COR	1/4/2006		1000		0
SRC-COR	1/17/2006		410		0
SRC-COR	2/22/2006		410		0
SRC-COR	3/7/2006		1710		0
SRC-COR	3/20/2006		3270		0
SRC-COR	4/18/2006		200		0
SRC-COR	5/15/2006		200		0
SRC-COR	6/19/2006		3436		0
SRC-COR	7/18/2006		1100		0
SRC-COR	8/22/2006		30		0
SRC-COR	10/10/2006		ND		0

SRC-101	5/15/2006		ND		0
SRC-101	6/19/2006		310		0
SRC-101	7/18/2006		ND		0
SRC-101	8/22/2006		ND		0
SRC-101	10/10/2006		ND		0
SDR-PUM	12/07/04	2420	2420		
SDR-PUM	01/12/05	2420	2149		
SDR-PUM	02/16/05	2420	1300		
SDR-PUM	03/23/05	2419	2419		
SDR-PUM	04/20/05	24192	765		0
SDR-PUM	07/26/05	2419	2419		0
SDR-PUM	08/16/05	2419	2419		0
SDR-PUM	10/25/2005		199		0
SDR-PUM	11/15/2005		676		0
SDR-PUM	12/13/2005		630		0
SDR-PUM	1/17/2006		100		0
SDR-PUM	2/22/2006		41		0
SDR-PUM	3/20/2006		14550		0
SDR-PUM	4/18/2006		3320		0
SDR-PUM	5/15/2006		100		0
SDR-PUM	6/19/2006		191		0
SDR-PUM	7/18/2006		1340		0
SDR-PUM	8/22/2006		630		0
SDR-PUM	10/10/2006		1950		0
SAL-MON	04/26/99			30	
SAL-MON	06/01/99			130	
SAL-MON	07/26/99			34	
SAL-MON	11/01/99			350	
SAL-MON	11/01/99			1300	
SAL-MON	12/06/99			49	
SAL-MON	01/10/00			49	
SAL-MON	02/07/00			240	
SAL-MON	02/07/00			230	
SAL-MON	04/26/01			790	
SAL-MON	05/31/01			130	
SAL-MON	06/28/01			170	
SAL-MON	12/07/04	2420	57		
SAL-MON	01/12/05	2420	816		
SAL-MON	02/16/05	2420	1046		
SAL-MON	03/23/05	2419	2419		
SAL-MON	04/20/05	5475	10		0
SAL-MON	06/20/05	24192	11		0
SAL-MON	07/26/05	2419	11		0
SAL-MON	08/16/05	2419	25		0
SAL-MON	10/25/2005		-1		0
SAL-MON	11/15/2005		10		0
SAL-MON	12/13/2005		ND		0
SAL-MON	12/19/2005		ND		0
SAL-MON	1/17/2006		ND		0

SAL-MON	1/23/2006	1300	100	70	
SAL-MON	2/27/2006	5000	600	270	
SAL-MON	3/28/2006	5000	200	170	
SAL-MON	4/25/2006	9000	31	60	
SAL-MON	5/23/2006	240	230	300	
SAL-MON	6/21/2006	2400	310	50	
SAL-MON	7/19/2006	2400	100	50	
SAL-MON	9/20/2006	500	100	50	
SAL-MON	10/18/2006	160000	63	80	
SAL-GON	01/12/05	2420	727		
SAL-GON	02/16/05	2420	770		
SAL-GON	04/20/05	6488	3		0
SAL-GON	06/20/05	228	50		0
SAL-GON	07/26/05	2419	33		0
SAL-GON	08/16/05	2419	115		0
SAL-GON	10/25/2005		ND		0
SAL-GON	11/15/2005		ND		0
SAL-GON	12/13/2005		32		0
SAL-GON	1/17/2006		20		0
SAL-GON	2/22/2006		20		0
SAL-GON	3/20/2006		135		0
SAL-GON	4/18/2006		41		0
SAL-GON	5/15/2006		52		0
SAL-GON	6/19/2006		63		0
SAL-GON	7/18/2006		62		0
SAL-GON	8/22/2006		740		1
SAL-GON	10/10/2006		ND		0
SAL-DAV	02/01/99			5000	
SAL-DAV	03/01/99			50	
SAL-DAV	04/05/99			13	
SAL-DAV	05/10/99			13	
SAL-DAV	06/03/99			5000	
SAL-DAV	07/07/99			170	
SAL-DAV	07/27/99			500	
SAL-DAV	07/27/99			500	
SAL-DAV	08/31/99			50	
SAL-DAV	08/31/99			240	
SAL-DAV	09/28/99			22	
SAL-DAV	09/28/99			50	
SAL-DAV	11/30/99			170	
SAL-DAV	11/30/99			300	
SAL-DAV	01/03/00			70	
SAL-DAV	01/03/00			80	
SAL-DAV	01/26/00			170	
SAL-DAV	01/26/00			300	
SAL-DAV	02/10/00			30000	
SAL-DAV	02/10/00			3000	
SAL-DAV	05/15/00			110	
SAL-DAV	07/25/01			2400	

SAL-DAV	09/18/01			330	
SAL-DAV	11/13/01			240000	
SAL-DAV	12/20/01			130	
SAL-DAV	01/21/02			1300	
SAL-DAV	02/25/02			33	
SAL-DAV	03/18/02			2400	
SAL-DAV	04/15/02			49	
SAL-DAV	05/13/02			31	
SAL-DAV	06/17/02			70	
SAL-DAV	07/17/02			300	
SAL-DAV	08/14/02			80	
SAL-DAV	09/11/02			50	
SAL-DAV	10/09/02			30	
SAL-DAV	11/12/02			240	
SAL-DAV	12/11/02			11000	
SAL-DAV	02/10/03			-1	
SAL-DAV	03/11/03			30	
SAL-DAV	03/01/04			1300	
SAL-DAV	03/29/04			50	
SAL-DAV	05/17/04			30	
SAL-DAV	06/21/04			30	
SAL-DAV	08/03/04			50	
SAL-DAV	12/07/04	2420	2420		
SAL-DAV	1/11/2005	1300	740	1300	
SAL-DAV	2/7/2005	24000	20	30	
SAL-DAV	02/16/05	2420	488		
SAL-DAV	3/9/2005	900	630	3000	
SAL-DAV	4/5/2005	2400	31	80	
SAL-DAV	04/20/05	4884	31		0
SAL-DAV	5/3/2005	270	52	50	
SAL-DAV	6/1/2005	1100	25	50	
SAL-DAV	06/20/05	2981	25		0
SAL-DAV	6/28/2005	300	200	80	
SAL-DAV	07/26/05	2419	50		0
SAL-DAV	8/2/2005	500	150	240	
SAL-DAV	08/16/05	2419	222		0
SAL-DAV	8/30/2005	300	17	80	
SAL-DAV	9/28/2005	3000	-0.5	8	
SAL-DAV	10/25/2005		10		0
SAL-DAV	10/26/2005	30000	10	50	
SAL-DAV	11/15/2005		169		0
SAL-DAV	11/21/2005	30000	350	300	
SAL-DAV	12/13/2005		36		0
SAL-DAV	12/19/2005		ND		0
SAL-DAV	12/20/2005	3000	970	800	
SAL-DAV	1/4/2006		2700		1
SAL-DAV	1/17/2006		63		1
SAL-DAV	1/23/2006	30000	100	30	
SAL-DAV	2/22/2006		-10		0

SAL-DAV	2/27/2006	3000	2200	30000	
SAL-DAV	3/7/2006		323		0
SAL-DAV	3/20/2006		168		0
SAL-DAV	3/28/2006	1300	100	80	
SAL-DAV	4/5/2006		2460		0
SAL-DAV	4/18/2006		52		0
SAL-DAV	4/25/2006	3000	31	230	
SAL-DAV	5/15/2006		20		0
SAL-DAV	5/23/2006	800	190	130	
SAL-DAV	6/19/2006		107		0
SAL-DAV	6/21/2006	1600	74	50	
SAL-DAV	7/18/2006		-10		0
SAL-DAV	7/19/2006	3000	41	50	
SAL-DAV	8/15/2006	3000	20	30	
SAL-DAV	8/22/2006		20		0
SAL-DAV	9/20/2006	30000	-5	23	
SAL-DAV	10/10/2006		345		0
SAL-DAV	10/18/2006	9000	41	300	
SAL-CHU	02/01/99			140	
SAL-CHU	03/01/99			4	
SAL-CHU	04/05/99			2	
SAL-CHU	06/03/99			170	
SAL-CHU	07/07/99			60	
SAL-CHU	07/27/99			13	
SAL-CHU	08/31/99			240	
SAL-CHU	11/30/99			30	
SAL-CHU	01/03/00			50	
SAL-CHU	01/26/00			900	
SAL-CHU	02/10/00			13	
SAL-CHU	04/24/00			13	
SAL-CHU	01/12/05	2420	866		
SAL-CHU	02/16/05	2420	866		
SAL-CHU	04/20/05	1046	21		0
SAL-CHU	06/20/05	50	41		0
SAL-CHU	07/26/05	1732	75		0
SAL-CHU	08/16/05	2419	105		0
SAL-CHU	10/25/2005		ND		0
SAL-CHU	11/15/2005		ND		0
SAL-CHU	12/13/2005		36		0
SAL-CHU	1/17/2006		10		0
SAL-CHU	1/24/2006	17000	41	230	
SAL-CHU	2/22/2006		10		0
SAL-CHU	2/28/2006	500	2100	13000	
SAL-CHU	3/20/2006		120		0
SAL-CHU	3/27/2006	1300	41	230	
SAL-CHU	4/5/2006		2310		0
SAL-CHU	4/18/2006		30		0
SAL-CHU	4/24/2006	2400	31	500	
SAL-CHU	5/15/2006		144		0

SAL-CHU	5/22/2006	900	52	240	
SAL-CHU	6/19/2006		74		0
SAL-CHU	6/20/2006	900	16	80	
SAL-CHU	7/18/2006		85		0
SAL-CHU	7/18/2006	500	63	80	
SAL-CHU	8/14/2006	17000	31	130	
SAL-CHU	8/22/2006		10		0
SAL-CHU	10/10/2006		ND		0
SAL-BLA	12/07/04	2420	308		
SAL-BLA	01/12/05	2420	921		
SAL-BLA	02/16/05	2420	345		
SAL-BLA	03/23/05	2419	2419		
SAL-BLA	04/20/05	5475	86		0
SAL-BLA	06/20/05	2419	20		0
SAL-BLA	07/26/05	2419	45		0
SAL-BLA	08/16/05	2419	364		0
SAL-BLA	10/25/2005		42		0
SAL-BLA	11/15/2005		63		0
SAL-BLA	12/13/2005		98		0
SAL-BLA	1/17/2006		41		0
SAL-BLA	2/22/2006		-10		0
SAL-BLA	3/7/2006		95		0
SAL-BLA	3/20/2006		52		0
SAL-BLA	4/18/2006		31		0
SAL-BLA	5/15/2006		31		0
SAL-BLA	6/19/2006		121		0
SAL-BLA	7/18/2006		63		0
SAL-BLA	8/22/2006		563		0
SAL-BLA	10/10/2006		75		0
REC-VIC	10/25/2005		2419		0
REC-VIC	11/15/2005		602		0
REC-VIC	12/13/2005		76		0
REC-VIC	1/17/2006		860		1
REC-VIC	2/22/2006		100		0
REC-VIC	3/20/2006		960		0
REC-VIC	4/18/2006		3090		1
REC-VIC	5/15/2006		189		0
REC-VIC	6/19/2006		504		0
REC-VIC	7/18/2006		520		0
REC-VIC	8/22/2006		410		0
REC-VIC	10/10/2006		262		0
QUA-POT	02/01/99			2400	
QUA-POT	07/07/99			1100	
QUA-POT	07/27/99			110	
QUA-POT	08/31/99			1600	
QUA-POT	11/02/99			240	
QUA-POT	02/10/00			5000	
QUA-POT	1/24/2006	24000	1600	2200	
QUA-POT	2/28/2006	11000	1100	24000	

QUA-POT	3/27/2006	50000	210	3000	
QUA-POT	4/24/2006	160000	100	240	
QUA-POT	5/22/2006	28000	1600	2400	
QUA-POT	6/20/2006	50000	630	1100	
QUA-POT	7/18/2006	160000	410	800	
QUA-POT	8/14/2006	160001	100	500	
QUA-POT	9/19/2006	160000	410	3000	
QUA-POT	10/17/2006	700	2300	5000	
QUA-OSR	11/09/99			160001	
QUA-OSR	11/30/99			130	
ORO-END	4/5/2006		11780		0
OLS-POT	04/26/99			26	
OLS-POT	06/01/99			300	
OLS-POT	06/28/99			170	
OLS-POT	07/26/99			110	
OLS-POT	07/26/99			140	
OLS-POT	11/01/99			490	
OLS-POT	12/06/99			240	
OLS-POT	01/10/00			490	
OLS-POT	02/07/00			54000	
OLS-POT	12/07/04	2420	1986		
OLS-POT	01/12/05	2420	2420		
OLS-POT	02/16/05	2420	2420		1
OLS-POT	03/23/05	2419	2419		1
OLS-POT	04/20/05	24192	160		0
OLS-POT	06/20/05	1733	20		0
OLS-POT	07/26/05	2419	866		0
OLS-POT	08/16/05	2419	2419		0
OLS-MON	06/01/99			50	
OLS-MON	06/28/99			300	
OLS-MON	06/28/99			300	
OLS-MON	06/28/99			300	
OLS-MON	07/26/99			500	
OLS-MON	11/01/99			230	
OLS-MON	12/06/99			350	
OLS-MON	01/10/00			240	
OLS-MON	01/10/00			490	
OLS-MON	02/07/00			1750	
OLS-MON	04/26/01			7000	
OLS-MON	05/31/01			4600	
OLS-MON	06/28/01			24000	
OLS-MON	07/25/01			24000	
OLS-MON	08/30/01			1100	
OLS-MON	09/18/01			5400	
OLS-MON	10/16/01			16000	
OLS-MON	11/13/01			92000	
OLS-MON	12/20/01			30	
OLS-MON	12/20/01			30	
OLS-MON	01/21/02			130	

OLS-MON	02/25/02			23	
OLS-MON	03/18/02			9200	
OLS-MON	04/15/02			700	
OLS-MON	05/13/02			330	
OLS-MON	07/17/02			1600	
OLS-MON	08/14/02			240	
OLS-MON	09/11/02			2200	
OLS-MON	10/09/02			230	
OLS-MON	11/12/02			500	
OLS-MON	12/11/02			500	
OLS-MON	02/10/03			30	
OLS-MON	03/11/03			110	
OLS-MON	03/01/04			1300	
OLS-MON	03/29/04			130	
OLS-MON	05/17/04			300	
OLS-MON	06/21/04			8000	
OLS-MON	08/03/04			16000	
OLS-MON	12/07/04	2420	152		
OLS-MON	1/11/2005	9000	5200	1700	
OLS-MON	01/12/05	2420	2420		
OLS-MON	2/7/2005	1100	85	300	
OLS-MON	02/16/05	2420	1120		
OLS-MON	3/9/2005	90000	200	230	
OLS-MON	03/23/05	2419	2419		
OLS-MON	4/5/2005	1300	2000	3000	
OLS-MON	04/20/05	15531	122		0
OLS-MON	5/3/2005	2400	200	230	
OLS-MON	6/1/2005	1300	100	500	
OLS-MON	06/20/05	2419	1388		0
OLS-MON	6/28/2005	1300	31	170	
OLS-MON	07/26/05	24192	85		0
OLS-MON	8/2/2005	3000	200	500	
OLS-MON	08/16/05	2419	866		0
OLS-MON	8/30/2005	3000	16	1300	
OLS-MON	9/28/2005	5000	300	1700	
OLS-MON	10/25/2005		170		0
OLS-MON	10/26/2005	5000	680	1300	
OLS-MON	11/15/2005		185		0
OLS-MON	11/21/2005	9000	240	500	
OLS-MON	12/13/2005		600		0
OLS-MON	12/19/2005		ND		0
OLS-MON	12/20/2005	9000	520	1400	
OLS-MON	1/4/2006		1900		0
OLS-MON	1/17/2006		2590		0
OLS-MON	1/23/2006	160001	100	300	
OLS-MON	2/22/2006		218		0
OLS-MON	2/27/2006	17000	2000	7000	
OLS-MON	3/7/2006		410		0
OLS-MON	3/20/2006		393		1

OLS-MON	3/28/2006	9000	1900	2400	
OLS-MON	4/18/2006		310		1
OLS-MON	4/25/2006	1700	740	240	
OLS-MON	5/15/2006		520		0
OLS-MON	5/23/2006	3000	2000	2400	
OLS-MON	6/19/2006		105		0
OLS-MON	6/21/2006	5000	100	300	
OLS-MON	7/18/2006		74		0
OLS-MON	7/19/2006	5000	100	500	
OLS-MON	8/15/2006	3000	920	1100	
OLS-MON	8/22/2006		710		0
OLS-MON	9/20/2006	5000	730	500	
OLS-MON	10/10/2006		20		0
OLS-MON	10/18/2006	30000	910	500	
GAB-VET	12/07/04	2420	2420		
GAB-VET	01/12/05	2420	1414		
GAB-VET	02/16/05	2420	2420		1
GAB-VET	03/23/05	2419	2419		1
GAB-VET	04/20/05	7270	10		0
GAB-VET	06/20/05	125	93		0
GAB-VET	07/26/05	2419	25		0
GAB-VET	08/16/05	2419	69		0
GAB-VET	10/25/2005		17		0
GAB-VET	11/15/2005		31		0
GAB-VET	12/13/2005		20		0
GAB-VET	12/19/2005		ND		0
GAB-VET	1/4/2006		710		0
GAB-VET	1/17/2006		20		0
GAB-VET	2/22/2006		31		0
GAB-VET	3/7/2006		5630		0
GAB-VET	3/20/2006		2530		0
GAB-VET	4/18/2006		100		0
GAB-VET	5/15/2006		300		0
GAB-VET	6/19/2006		228		0
GAB-VET	7/18/2006		74		0
GAB-VET	8/22/2006		52		0
GAB-VET	10/10/2006		63		0
GAB-SAN3	4/18/2006		253		0
GAB-SAN2	4/18/2006		31		0
GAB-SAN1	4/18/2006		-10		0
GAB-OSR	12/07/04	2420	154		
GAB-OSR	01/12/05	2420	326		
GAB-OSR	02/16/05	2420	649		
GAB-OSR	03/23/05	2419	2419		1
GAB-OSR	04/20/05	1553	158		0
GAB-OSR	06/20/05	579	548		0
GAB-OSR	07/26/05	1553	435		0
GAB-OSR	08/16/05	2419	1046		0
GAB-OSR	10/25/2005		1120		0

GAB-OSR	11/15/2005		231		0
GAB-OSR	11/30/2005		ND		0
GAB-OSR	12/13/2005		246		0
GAB-OSR	12/19/2005		ND		0
GAB-OSR	1/4/2006		360		0
GAB-OSR	1/17/2006		171		0
GAB-OSR	2/22/2006		98		0
GAB-OSR	3/7/2006		323		0
GAB-OSR	3/20/2006		86		0
GAB-OSR	4/5/2006		2280		1
GAB-OSR	4/18/2006		41		0
GAB-OSR	5/15/2006		156		1
GAB-OSR	6/19/2006		345		0
GAB-OSR	7/18/2006		31		1
GAB-OSR	8/22/2006		241		0
GAB-OSR	10/10/2006		160		0
GAB-NAT	12/07/04	2420	2420		
GAB-NAT	01/12/05	2420	1733		
GAB-NAT	02/16/05	2420	2419		1
GAB-NAT	03/23/05	2419	2419		
GAB-NAT	10/25/2005		ND		0
GAB-NAT	11/15/2005		ND		0
GAB-NAT	12/13/2005		ND		0
GAB-NAT	1/4/2006		400		0
GAB-NAT	1/17/2006		ND		0
GAB-NAT	3/7/2006		2750		0
GAB-NAT	3/20/2006		520		1
GAB-NAT	4/5/2006		7590		1
GAB-NAT	4/18/2006		2410		1
GAB-NAT	5/15/2006		ND		0
GAB-HER	12/07/04	2420	2420		
GAB-HER	01/12/05	2420	1203		
GAB-HER	02/16/05	2420	2420		1
GAB-HER	03/23/05	2419	2419		1
GAB-HER	04/20/05	687	35		0
GAB-HER	06/20/05	1986	435		0
GAB-HER	07/26/05	17329	770		0
GAB-HER	08/16/05	2419	365		0
GAB-HER	10/25/2005		2419		0
GAB-HER	11/15/2005		631		0
GAB-HER	11/30/2005		ND		0
GAB-HER	12/13/2005		1310		0
GAB-HER	12/19/2005		ND		0
GAB-HER	1/4/2006		760		0
GAB-HER	1/17/2006		213		0
GAB-HER	2/22/2006		148		0
GAB-HER	3/7/2006		4730		0
GAB-HER	3/20/2006		121		1
GAB-HER	4/5/2006		6200		1

GAB-HER	4/18/2006		189		1
GAB-HER	5/15/2006		300		1
GAB-HER	6/19/2006		703		0
GAB-HER	7/18/2006		410		0
GAB-HER	8/22/2006		1210		0
GAB-HER	10/10/2006		327		0
GAB-DAI	04/20/05	48840	200		0
GAB-CRA	12/07/04	2420	2420		
GAB-CRA	01/12/05	2420	1203		
GAB-CRA	02/16/05	2420	1120		
GAB-CRA	03/23/05	2419	2419		
GAB-CRA	04/20/05	2909	504		0
GAB-CRA	06/20/05	2419	488		0
GAB-CRA	07/26/05	3873	512		1
GAB-CRA	08/16/05	2419	488		0
GAB-CRA	10/25/2005		416		0
GAB-CRA	11/15/2005		280		0
GAB-CRA	11/30/2005		ND		0
GAB-CRA	12/13/2005		960		0
GAB-CRA	12/19/2005		ND		0
GAB-CRA	1/4/2006		820		0
GAB-CRA	1/17/2006		305		0
GAB-CRA	2/22/2006		109		0
GAB-CRA	3/7/2006		2620		0
GAB-CRA	3/20/2006		249		1
GAB-CRA	4/5/2006		6570		1
GAB-CRA	4/18/2006		275		1
GAB-CRA	5/15/2006		860		1
GAB-CRA	6/19/2006		1250		0
GAB-CRA	7/18/2006		1350		1
GAB-CRA	8/22/2006		521		1
GAB-CRA	10/10/2006		2750		1
ELT-68	4/5/2006		5040		0
ELT-68	4/18/2006		1610		0
ELT-68	5/15/2006		860		0
CHU-CRR	10/25/2005		154		0
CHU-CRR	11/15/2005		ND		0
CHU-CRR	12/13/2005		ND		0
CHU-CRR	12/19/2005		ND		0
CHU-CRR	1/4/2006		840		0
CHU-CRR	1/17/2006		ND		0
CHU-CRR	2/22/2006		-10		0
CHU-CRR	3/7/2006		520		0
CHU-CRR	3/20/2006		146		0
CHU-CRR	4/5/2006		6020		0
CHU-CCR	10/25/2005		ND		0
CHU-CCR	11/15/2005		ND		0
CHU-CCR	12/13/2005		ND		0
CHU-CCR	1/17/2006		ND		0

CHU-CCR	4/5/2006		30440		1
BLA-COO	12/07/04	2420	1120		
BLA-COO	01/12/05	2420	23		
BLA-COO	02/16/05	2420	137		
BLA-COO	04/20/05	1733	299		0
BLA-COO	06/20/05	1986	649		0
BLA-COO	07/26/05	24192	148		0
BLA-COO	08/16/05	2419	86		0
BLA-COO	10/25/2005		48		0
BLA-COO	11/15/2005		10		0
BLA-COO	12/13/2005		31		0
BLA-COO	1/4/2006		120		0
BLA-COO	1/17/2006		ND		0
BLA-COO	2/22/2006		20		0
BLA-COO	3/7/2006		131		0
BLA-COO	4/18/2006		100		0
BLA-COO	5/15/2006		31		0
BLA-COO	6/19/2006		75		0
BLA-COO	7/18/2006		209		0
BLA-COO	8/22/2006		75		0
BLA-COO	10/10/2006		20		0
ARR-GOR	4/18/2006		10		0
ARR-GOR	5/15/2006		11		0
ARR-GOR	8/22/2006		-10		0
ARR-GOR	10/10/2006		-10		0
ALI-OSR	07/28/99			17000	
ALI-OSR	08/31/99			5000	
ALI-OSR	09/28/99			2	
ALI-OSR	11/02/99			5000	
ALI-OSR	01/26/00			1600	
ALI-OSR	02/10/00			3000	
ALI-OSR	01/12/05	2420	980		
ALI-AIR	02/01/99			30000	
ALI-AIR	03/01/99			220	
ALI-AIR	04/05/99			110	
ALI-AIR	05/10/99			11000	
ALI-AIR	06/03/99			9000	
ALI-AIR	07/07/99			160000	
ALI-AIR	07/27/99			11000	
ALI-AIR	08/31/99			17000	
ALI-AIR	09/28/99			160000	
ALI-AIR	11/02/99			24000	
ALI-AIR	11/09/99			160001	
ALI-AIR	11/30/99			9000	
ALI-AIR	01/03/00			160001	
ALI-AIR	01/26/00			900	
ALI-AIR	02/10/00			2300	
ALI-AIR	12/07/04	2420	1733		
ALI-AIR	01/12/05	2420	2420		

ALI-AIR	02/16/05	2420	2420		
ALI-AIR	04/20/05	93	2		0
ALI-AIR	06/20/05	727	649		0
ALI-AIR	07/26/05	2419	435		0
ALI-AIR	08/16/05	2419	1203		0
ALI-AIR	10/25/2005		142		0
ALI-AIR	11/15/2005		20		0
ALI-AIR	12/13/2005		41		0
ALI-AIR	12/19/2005		ND		0
ALI-AIR	1/4/2006		2000		0
ALI-AIR	1/17/2006		1450		0
ALI-AIR	1/24/2006	50000	20	240	
ALI-AIR	2/22/2006		200		0
ALI-AIR	2/28/2006	17000	1200	24000	
ALI-AIR	3/7/2006		12590		0
ALI-AIR	3/20/2006		120		0
ALI-AIR	3/28/2006	160001	1100	2400	
ALI-AIR	4/18/2006		4640	#REF!	1
ALI-AIR	4/25/2006	160000	310	500	
ALI-AIR	5/15/2006		850		0
ALI-AIR	5/23/2006	17000	520	1600	
ALI-AIR	6/19/2006		631		0
ALI-AIR	6/21/2006	24000	850	3000	
ALI-AIR	7/18/2006		410		0
ALI-AIR	7/19/2006	16000	41	2400	
ALI-AIR	8/15/2006	50000	470	2400	
ALI-AIR	8/22/2006		1090		0
ALI-AIR	9/20/2006	50000	2100	2400	
ALI-AIR	10/10/2006		4480		0
ALI-AIR	10/18/2006	50000	100	800	
309SDR	02/01/99			1300	
309SDR	03/01/99			4	
309SDR	04/05/99			170	
309SDR	05/10/99			4	
309SDR	07/07/99			50	
309SDR	07/27/99			300	
309SDR	09/28/99			30	
309SDR	11/02/99			14000	
309SDR	11/30/99			22000	
309SDR	01/06/00			160001	
309SDR	01/26/00			500	
309SDR	02/10/00			11000	
309SDR	2/27/2006	160001	21000	30000	
309SDR	3/28/2006	160001	2200	9000	
309SDR	5/23/2006	8000	1700	3000	
309SDR	6/21/2006	50000	850	800	
309SDR	7/19/2006	3000	100	300	
309SDR	8/15/2006	2400	85	240	
309SDR	9/20/2006	30000	52	70	

309SDR	10/18/2006	16000	85	300	
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